The Veterinary Record

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 30. JULY 23, 1932. VOL. 12.

A DISEASE OF LACTATING COWS ASSOCIATED WITH INTRACYTOPLASMIC BLUE BODIES

Part I.—Epidemiology, Symptomatology and Morbid Anatomy

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The following preliminary observations of a disease of cows are based upon the clinical reports accompanying *post-mortem* material sent to the laboratory, the results of consultations at six affected farms and the pathological examination of eight cases of which detailed records were preserved. The material and records were obtained this year from Lincolnshire, Shropshire, Herefordshire, Gloucestershire, Oxfordshire, Hertfordshire and Sussex. In some districts the disease is unnamed, in others it is variously known as brain fever, bovine hysteria, pseudo-milk fever, deficiency disease or tetany.

EPIDEMIOLOGY

The disease is confined to lactating cows. Calves, maiden heifers, dry cows, bulls, bullocks, sheep, goats, horses, pigs and poultry on the same pasture are not affected. Cows with calf at foot are affected equally with those from whom the calves had been removed at birth. The disease has been observed in Shorthorns, Lincoln Reds, Jerseys and Dexters and cross-bred cows varying in age from 1st to 5th calvers.

The disease is associated with grazing. It occurs in cows which have been newly turned out or which have been at grass throughout the winter. As yet no reports have been received of the disease having occurred in cows kept on constant dry feed in byres or yards.

The onset of the disease occurs in April and May: this year, with its late spring, the onset of a few cases of the chronic type has been in June.

The onset occurs within one to 12 weeks of parturition, occasional cases have been calved six or seven months.

One owner in Lincolnshire asserted that he has recognised odd cases of the disease for the past 12 years and that it has increased considerably during the past four years. He was convinced that in his district a number of cases of the disease had been mistakenly diagnosed as "lightning stroke." Few of the owners appear to have had more than two years' experience of the disease; the majority have seen it for the first time this year. One owner had five cases in his 25 cows in 1928, none in 1929, two in 1931, and none this year to date.

The incidence varies considerably: the majority of owners have had only one or two cases in the year; one owner had 11 out of 55 cows (20 per cent.) affected, and another four out of 10 (40 per cent.). Almost invariably the disease proves fatal; an occasional mild case which recovers apparently normal health is reported.

SYMPTOMATOLOGY

The onset of the symptoms is sudden in cows which owners report as having appeared in good health giving a normal milk yield or doing their calves well. It is not related to any definite phenomenon, *e.g.*, it may occur while the herd is quietly grazing or going to and returning from milking in the byre. Some owners have observed the onset following a frosty night. Provisionally it may be convenient to classify the symptoms as of the acute, chronic and mild types.

ACUTE TYPE.—The initial seizure, lasting from five to 30 minutes, takes various forms. A cow may suddenly exhibit giddiness, or a rhythmical jerking of the head up and down, or distressed bellowing. An occasional case suddenly becomes frenzied and charges madly through and over all types of obstacles; she may collapse and die or break her neck or her owner may catch her before she injures herself seriously. During this initial phase the cow exhibits a fixed expression, together with fine tremors of isolated groups of muscles—particularly of the eyelids, jaws, ears, shoulders and flanks; her respiration rate is rapid and irregular.

The initial stage passes into a recumbent stage, in which the cow falls onto her side; her neck is fully extended and her head is thrown about violently so that one horn gouges up the ground or the muzzle and teeth are thrust into the soil. The limbs may paddle or they and the trunk pass into a succession of tetanic-like spasms, sometimes with pronounced opisthotonus.

After a few minutes or even several hours of these convulsions the cow may pass into semi-coma, with relaxation of her muscles, fæcal and urinary incontinence and regurgitation of a grass-coloured watery ingesta followed within a few minutes to six or more hours by death. Alternatively the convulsions may cease and the cow gets up; she appears dazed for a few

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minutes and then may resume grazing. She may appear all right for a few hours, or even three days, before the onset of another seizure, which ends fatally. One case is reported to have had a succession of seizures in the course of three days before dying.

Chronic Type.—Owners report various initial signs. As in the acute type the onset may be a rhythmical jerking of the head or giddiness. The cow may be found lying on her brisket with her head turned to one flank, not unlike the onset of milk fever, except that the pupils appear normal. Some cases merely stand with a fixed expression; if her head is approached the cow may suddenly and rapidly walk backwards, or she may stand grinding her teeth. A few cases have been found standing with their fore-limbs extended as if suffering from acute laminitis. All appear lethargic, with little or no interest in food and water.

Whether the cow is down or standing, fine tremors of 15 to 60 seconds' duration appear at irregular intervals in the tensor vaginæ femoris, serratus magnus and muscles of the eyelids and face. The frequency and intensity of these tremors are increased by exercising those cows which are standing or are able to get up. On palpation intermittent fine fibrillary tremors are felt along the longissimus dorsi. When exercised the cow holds her spine rigidly and arched upwards; her hind limbs are moved stiffly with exaggerated abduction.

Rumination is usually lost. Defæcation takes place more often than normally but there is no tenesmus. The fæces have a very noticeable "sour" odour and commonly they are darker than normal. Urination is normal. The temperature varies between 100·8° and 102°; no abnormalities are detected in the pulse, heart and respiration. Usually the superficial reflexes respond normally. In one case no response was elicited to pin-pricks posterior to the level of the last pair of ribs; after ten days this cow, when eased from the slings, would sit on her haunches with her hind legs splayed out; she died three weeks later. No response has been obtained to inflation of the mammary gland and to drugs (*e.g.*, calcium gluconate) customarily administered to milk fever cases.

The recumbent cases require slinging when they rapidly deteriorate; within two to four weeks they die in semi-coma or they are destroyed owing to weakness or to severe bed-sores. The signs observed at the onset usually continue day by day in spite of gruels and dry dietary appropriate to a sick cow in a comfortable loose box. Within one week of the onset the milk yield falls to one-half or more and emaciation becomes evident. Sometimes there are intervals of one to seven days in which the cow brightens up, eats and ruminates normally and shows less tendency to muscular tremors, but if exercised the arching of the back, stiff gait and lethargic expression persist. The brighter intervals become more infrequent, the tremors return, strength fails and eventually the cow goes down, her temperature becomes sub-normal and death in semi-coma ensues within four to six (sometimes less) weeks of the onset.

Mild Type.—Several cases have been reported to the laboratory as having exhibited onsets similar to those described for the chronic type followed by a mild course ending in recovery within two to three weeks. Personal observations have not been extended to this type.

MORBID ANATOMY

The struggles preceding death of the acute type are manifested at *post-mortem* by abrasions in the skin of the ears, face, shoulders and hips, by patches of hair matted with dried sweat and dirt and by the mouth being fouled with soil. Subcutaneous bruisings are usually found over the shoulders and quarters. There are many fine hæmorrhages into the muscles and deep fasciæ of the neck, trunk and shoulders; more numerous and more extensive hæmorrhages are found at the base of the neck and in the axillæ.

Broad hæmorrhages are found beneath the diaphragmatic pleura, with a few streaky ecchymoses beneath the costal pleura. The lungs are fully distended and their surface is mottled and streaked by hæmorrhages beneath the pleura, especially along the interlobular septa. A constant finding is a bilateral interstitial emphysema of the inferior and posterior edges of the posterior lobes and sometimes of both apices. In one case the emphysema extended into both roots but did not involve the mediastinum. There are no macroscopic bullæ or abnormalities of the bronchioles. There are extensive hæmorrhages into the mediastinum around the roots of the great vessels passing forwards into the lower part of the neck and backwards onto the pericardium. The pericardial cavity may contain one or two ounces of a straw-coloured watery transudate. There are many sub-epicardial ecchymoses, especially along the auriculo-ventricular grooves; patchy sub-endocardial ecchymoses are usually found in both ventricles. The cavities of the heart and larger blood vessels contain normal blood clot.

The mucosa of the proximal half of the small intestine shows patches of a rosy congestion, which may be dotted with petechiæ. The mucosa of the anus and rectum may be congested.

The liver externally appears normal or blood-filled, but a washed cut section reveals a homogeneous greyish-brown coloured parenchyma of normal consistency which is irregularly studded with small focal hæmorrhages; these hæmorrhages, usually about the size of a pin-head, may attain the size of a millet seed. In some cases the parenchyma may be faintly jaundiced.

There are numerous fine ecchymoses in the capsule of the spleen, usually at the edges and at the posterior pole. The majority of the lobules of the kidneys externally appear normal in colour; a minority are of a pale muddy-brown colour which may be homogeneous or spotted with lighter areas. On section the changes observed extend through the cortex. The capsule is tense and the medulla is slightly congested.

The meninges of the brain and spinal cord are slightly congested. Lenticular hæmorrhage may be found in the anterior chamber of the eyeball. No other constant macroscopic abnormality is found throughout the body.

Considerable difficulty may be experienced in defining the *post-mortem* appearances owing to the very rapid invasion of the tissues by gas-forming organisms. Within three hours of death the liver becomes " foamy," the mesentery is suffused with blood, the intestines are distended with gas and the hæmorrhagic lesions are darkened and gas-filled. When tissues are required for histological examination it is necessary to perform the *post-mortem* within one hour of death.

The above records are based upon *post-mortem* observations of the acute type and of the chronic type dying within two weeks of the onset.

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(1) Preliminary observations on the epidemiology, symptomatology and morbid anatomy of a disease of lactating cows are reported.

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(3) The symptoms are provisionally classified as acute, chronic and mild types. The acute and chronic types appear to be invariably fatal; recovery of an occasional mild case is reported.

(4) The lesions macroscopically obvious at *post-mortem* consist of (*a*) hæmorrhages into the mediastinum, the muscles and fasciæ of the neck, trunk and axillæ, into the pleura, heart, lungs, liver, capsule of the spleen and eyeballs, and (*b*) an interstitial emphysema of the bases or apices.

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THE PATHOLOGY OF REPRODUCTION IN DOMESTIC ANIMALS*

W. L. WILLIAMS
Ithaca, New York
(*Professor Emeritus; formerly Professor of Obstetrics and Research Professor in the Diseases of Breeding Cattle in the New York State Veterinary College at Cornell University.*)

No. 5.—The Puerperal Period in Relation to the Pathology of Reproduction †

In the preceding sections it has been aimed to show that physiological pregnancy can be established only by the mating of *two sexually healthy* individuals. It was further pointed out that after apparently physiological conception has occurred the pregnant female requires, for the safety of her own genital health and of the health of her intrauterine progeny, that her nutrition and environment as a whole be physiologically maintained. It has been erroneously assumed by many that if a female conceives she is *a priori* genitally healthy. Hence in recording the results of handling a sterile female, the treatment is said to be *successful* if the female *conceives*, regardless of what becomes of her pregnancy.

The pregnant uteri of cows, used for demonstration, showed various stages of gestation, and regardless of the period of pregnancy there were proofs of intrauterine disease in an important portion of specimens, especially after the fœtus had reached 12 inches in length. The outstanding evidences of genital disease consisted of damage to, or destruction of uterine caruncles, the formation of adventitious placental structures and the presence of fœtal diarrhœa.

THE UTERINE CARUNCLES AND COTYLEDONS

The bovine uterus conforms strictly to well established laws of form, structure and func-

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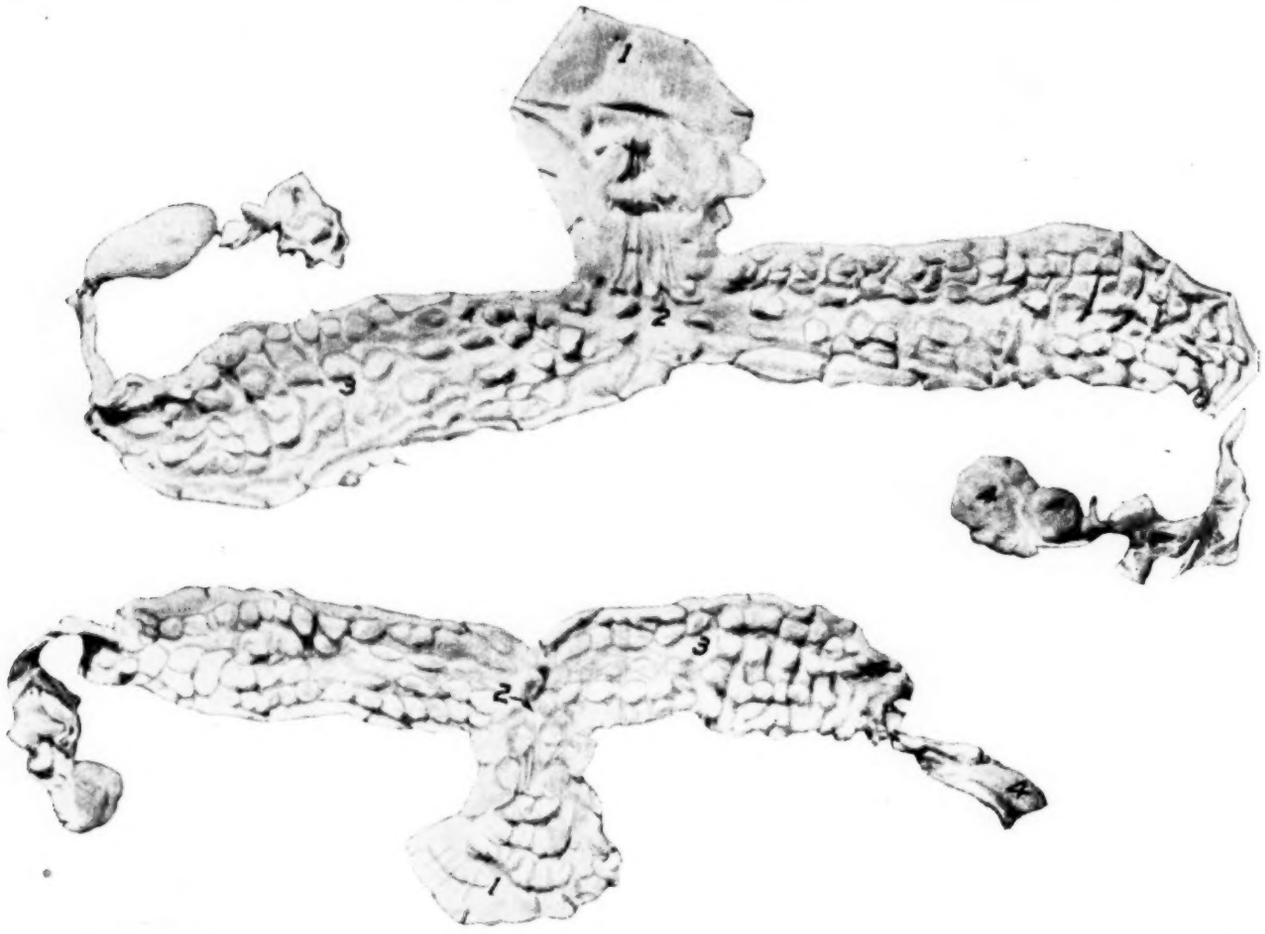

Fig. 5. *Uterine Caruncles of Veal Heifers*—1, vagina, 2, cervix ; 3, right cornu ; 4, ovary. Age of calves estimated at five to ten weeks. The inter-cornual ligaments, muscles and other tissues have been severed and the cornua spread at right angles to the cervix. The cornua have been incised along their greater curvature. The caruncles, as readily may be seen, are arranged in four rows with about 15 caruncles in each row of each cornu or a total of about 120. In the heifer calf and in the virgin heifer, the greater diameter of the caruncles corresponds with the longitudinal diameter of the cornua. The caruncles virtually consist of segments of longitudinal ridges in the uterine mucosa or endometrium. When pregnancy comes (see Fig. 6) the development of the cotyledons causes a shift in the diameters, and the greater diameter is transverse.
It will be seen from these illustrations that the bovine uterus is without an actual body and consists of two horns and a cervix only. The *uterine body* commonly described by veterinary anatomists is essentially fictitious for ruminants but is maintained in an effort to preserve the analogy with those uteri which have a true uterine body.

tion. In Fig. 5 are shown two typical uteri of veal heifers. As soon as the fœtus forms, the uterine mucosa is thrown into four major, and two minor longitudinal ridges. The four major ridges become divided transversely by a series of depressions which divide each ridge into about 30 segments, each of which is disc-shaped, pedunculated and with its greatest diameter parallel to the longitudinal diameter of the cornua. These constitute the caruncles (protuberances). When pregnancy occurs the caruncles undergo profound change, the growth of the caruncles is preponderantly transverse and their greater diameters shift from longitudinal to transverse as shown in Fig. 6. Sometimes, but not generally, the two minor ridges in the fœtal uterine mucosa develop few or numerous caruncles. The major ridges may be designated lateral and median pairs. One of each pair is dorsal, the other ventral. The two minor ridges are on the middle line, one along the floor of the cornu, opposite the mesometrium, the other at the opposite side of the cornu, along the greater curvature. When this superior ridge develops, which is uncommon, a cow suffering from retained afterbirth may present the unusual features of retention along the median line of the roof of the cornu.

Some high authorities have stated that the rows of caruncles vary ; that there may be four rows in the gravid horn and perhaps only three in the non-gravid cornu. In a study of over 100 uteri of heifer calves, each had the four major rows of cotyledons alike in both horns, and among pregnant uteri I have not found one, except virulent disease had caused the disappearance of the caruncles in one horn, in which the four rows were not clearly traceable. When a specimen is not properly prepared in this respect the rows may be thrown into mechanical

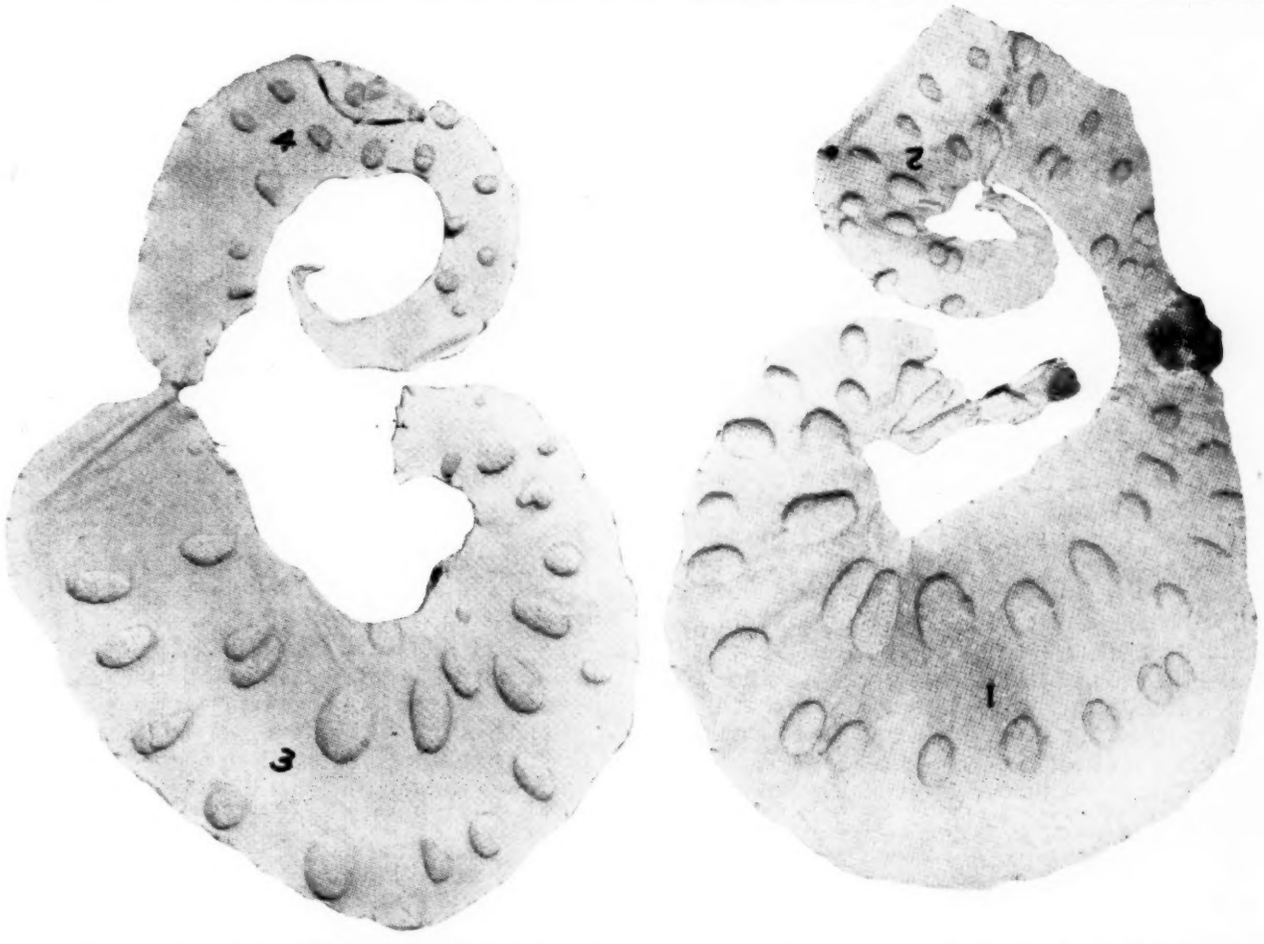

Fig. 6. *Uterus from a Heifer Estimated at 90 to 100 Days Pregnant.* Uterus prepared as in Fig. 5. 1, lateral side of gravid horn ; 2, lateral side of non-gravid horn ; 3, median side of the gravid horn ; 4, median side of non-gravid horn. The uterine seal is seen midway between 1 and 2.

The growth of the uterus due to pregnancy has served to increase the distance between the caruncles and the regularity of their arrangement in four parallel rows is brought out far more clearly than in Fig. 5. It is also evident that the greater diameter of the caruncles has shifted in pregnancy from longitudinal to transverse.

confusion. The error, of the authorities referred to above, regarding the number of rows of caruncles, is due, evidently, to their having used, for their study, badly diseased uteri, or to having improperly arranged their specimens.

A more serious error has arisen concerning the arrangement and physiology of the caruncles through a lamentable confusion in nomenclature, the two terms, *caruncle* and *cotyledon* being used synonymously. When correctly used, caruncle (protuberance) signifies the elevations or protuberances shown in Fig. 5. When pregnancy occurs, there is developed a new tissue from the superficial cellular layer upon the summits of the caruncles. This new tissue grows out toward the " fœtal cotyledon " —which is not truly a cotyledon—and the latter sends outgrowths into this new tissue in the form of placental villi or tufts, such as shown in Fig. 9. These sink into crypts, shown in Fig. 6. The new-formed tissue, to the bottom of the crypts, constitutes the cotyledons. After pregnancy has closed, this special new tissue is reabsorbed and disappears in the adeciduates (cow, ewe, mare) or drops away with the fœtal structures in deciduates (bitch, cat). In the confusion it has been stated that the caruncles of the healthy cow disappear after calving, but this is incorrect; they persist until the end of life unless destroyed by disease. In this confusion some influential writers assert that caruncles which have been destroyed by necrosis are renewed in the next pregnancy. The statement is absolutely without foundation. The uterus of the cow can no more produce a new caruncle which has been destroyed than can the leg produce a new foot in case the original has been cut off. An understanding of these basic truths is essential to a comprehension of the pathology of the uterus. Writers upon veterinary anatomy regularly describe the ruminant uterus as consisting of two horns and a body. Figs. 5 and 6 show definitely that no uterine body exists but that there are two cornua, the caudal openings of which meet opposite the anterior (cephalic) and of the cervix.

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ADVENTITIOUS PLACENTAL GROWTHS

When the living membrane of the uterus has been seriously damaged by disease but not completely destroyed, it frequently produces a new growth of placental tissue. These are frail, irregular outgrowths which do not develop into definite caruncles. The tissue acts as a substitute for the physiological placentæ but is defective in its power to afford nutrition to a fœtus. Sometimes when almost all caruncles have been destroyed, these adventitious structures serve to supply sufficient nourishment to produce a viable calf, but almost always, if not in every instance, the calf is more or less premature and is small. The constant tendency is toward interruption of the pregnancy.

The pregnant uteri from the abattoir largely contained fœtuses which had suffered from diarrhœa. This is the rule in dairy cows; the amniotic fluid contains meconium. In early pregnancy it usually gives to the amniotic fluid a brownish colour, and the fluid is turbid. Flakes of dark meconium float in the liquid. Later in pregnancy the meconium is yellow and when fœtal diarrhœa continues to or near birth the calf is born, or the dead fœtus expelled, thickly smeared over with yellow, pasty meconium. In the ideally healthy fœtus the amniotic fluid is clear, very faintly straw-coloured and contains no floating particles. Of all domestic animals, cattle have the greatest tendency toward diarrhœa. Diarrhœa is a prominent symptom in various diseases. It is common in most forms of sepsis and is very common in the later stages of septic metritis. So when toxic substances from a diseased placenta enter the fœtal blood stream the fœtus promptly responds with diarrhœa. The fœtal diarrhœa, in the material at hand, was in complete harmony with the extent of placental disease. In each case where placental lesions were prominent, fœtal diarrhœa was present. In dairy cows, if adventitious placental growths are numerous, if there is extensive necrosis of the chorion, etc., fœtal diarrhœa is very likely to be recognisable.

THE FŒTAL MEMBRANES IN RELATION TO THE PATHOLOGY OF REPRODUCTION

In 1924, Udall, Frost and others with myself, recorded extensive studies in which it was clearly shown, at least thus far without contradiction, that careful studies of freshly expelled fœtal membranes, under adequate technique, reveal authentically the history of uterine disease in the past and present and enables the observer to make a reliable forecast of the breeding future

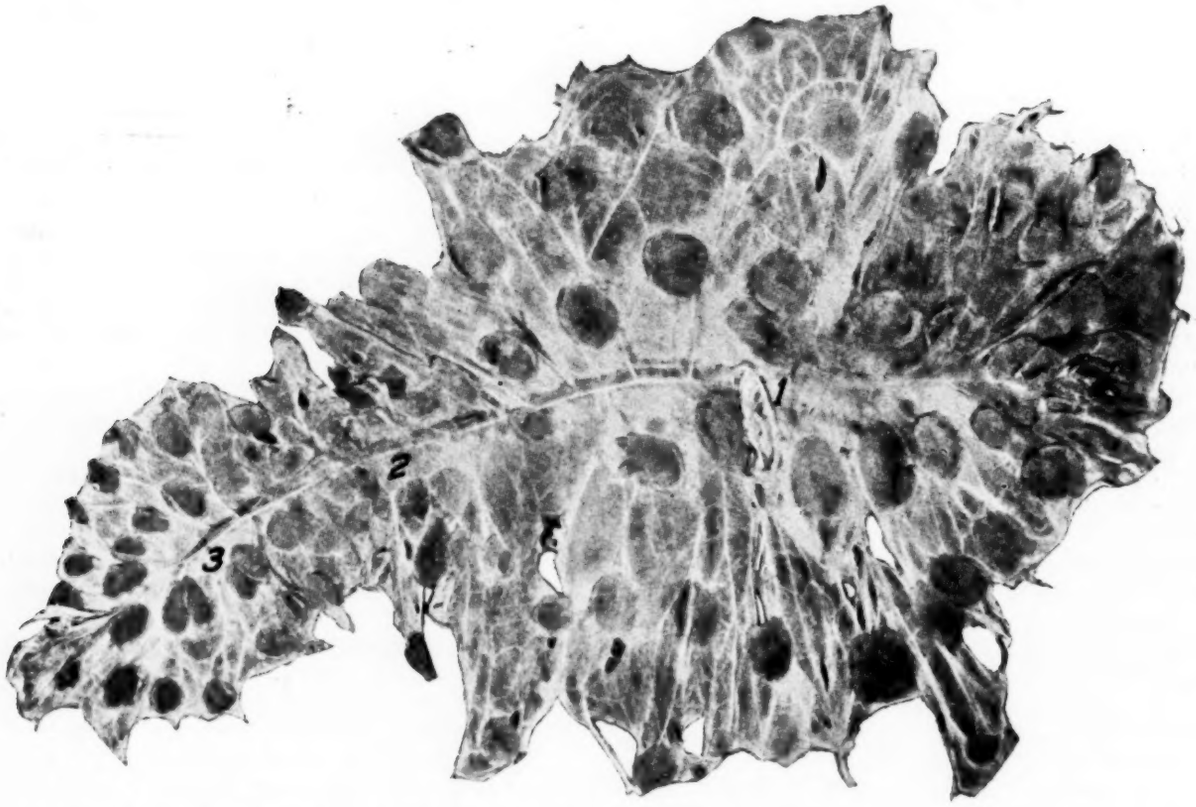

Fig. 7. *Allantois-Chorion from a Sexually Healthy Cow.* The fœtal sac has been incised along its greater curvature, between the two dorsal rows of caruncles. Shown from the endometrial (uterine) side. 1, the chorionic navel; 2, the cervix; 3, the non-gravid cornu.

The caruncles are regularly arranged in four parallel rows and the cotyledons are symmetrical in size and form. No adventitious placental formations are present.

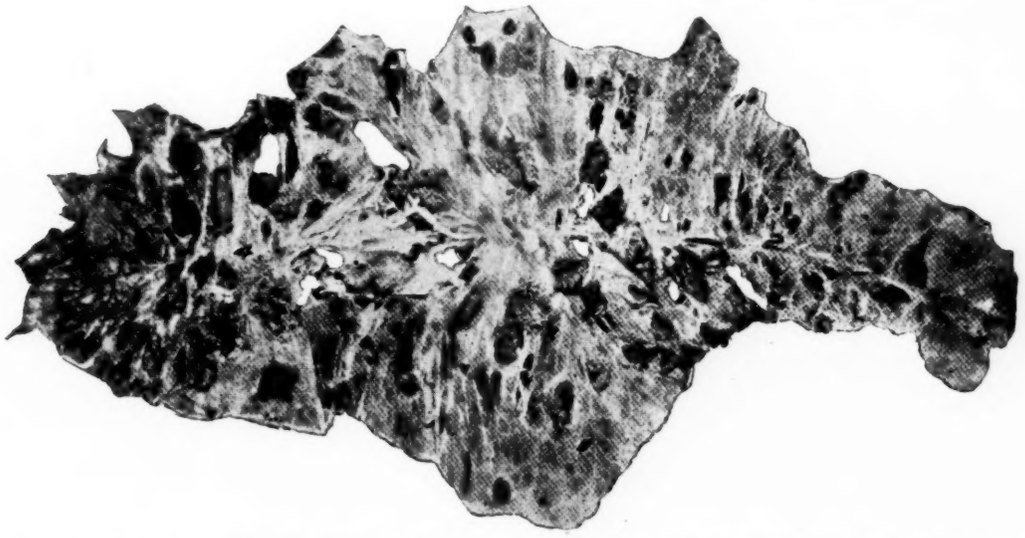

Fig. 8. *Allantois-Chorion from a Sexually Unsound Cow.* 1, the very small, naked non-gravid horn ; 2, cervix ; 3, Chorionic navel ; 4, ovarian pole of the gravid horn with adventitious placental growths. This cow required repeated breedings for conception. Some of her gestation periods were abbreviated, others prolonged. A comparison with Fig. 7 serves to explain at least in part, the variations in the duration of pregnancy. The non-gravid horn, 1, from the cervix, 2, to its ovarian pole has been wrecked by disease associated with a prior pregnancy and can supply virtually no nutrition to the fœtus—in the healthy uterus shown in Fig. 7, the non-gravid horn, 3, is fully supplied with healthy cotyledons, competent to contribute largely to the nutrition of the fœtus, thus largely relieving the load upon the gravid horn.

Fig. 8 illustrates nature's effort to compensate, through hypertrophy of one part, for a loss of function in another portion of the same organ. As a substitute for the loss of function in the non-gravid horn, 1, the cotyledons in the gravid horn have grown to gigantic size and a further effort at compensation is made at the ovarian pole, 4, where adventitious placental development has occurred. Conception can not occur on the side which is non-pregnant in the gestation illustrated ; if bred when ovulating on that side the service fails. The pregnancy in the less injured cornu is menaced by the overloading of the one horn and the lowered vitality of the damaged uterus. The cow is rendered subject to disaster under unfavourable conditions which would not threaten the life of a fœtus in a healthy uterus like that shown in Fig. 1. The constant tendency is for the lesion to increase progressively in area with each pregnancy towards the condition illustrated in Fig. 9, which is the end of reproductive life.

of the animal; unless new forces come into play competent to overpower the intrinsic powers of defence possessed by the individual. As already stated, while discussing observations upon abattoir material, the uterine caruncles are formed early in embryonic life and remain constant throughout life except they are destroyed or injured by disease. The contrast between health and disease is well shown in Figs. 7 and 8. That in Fig. 7 is from a highly fertile cow which regularly conceives at the first service, while Fig. 8 is from a poor breeder. The non-gravid horn (3) in Fig. 7 is proportionally much larger than in Fig. 8. This in itself reveals the comparative health of the two uteri from which they came, and shows that in Fig. 7 the fœtus obtained a far greater and better nutritive supply from the non-gravid horn, than in Fig. 8. This variation in health, as indicated by the comparative volume of the non-pregnant horn, is recognisable upon rectal palpation in the pregnant cow and is very significant. The pregnancy in Fig. 7 is clearly safer than in Fig. 8, the duration of pregnancy will be more nearly ideal, dystocia will not occur in Fig. 7, but is probable in Fig. 8. The new-born calf of Fig. 7 will be vigorous and not so highly susceptible to diarrhœa and pneumonia as that of Fig. 8, and will ultimately develop into a more valuable animal.

That is a small part of the picture. Further study will show that the fœtal placentæ or cotyledons of Fig. 7 are large and regular in the non-pregnant horn, while in Fig. 8 they are absent in that area, so that all nutrition must come from the pregnant horn, which diminishes the available food supply to the fœtus.

The cow represented by Fig. 7 mated with a healthy bull should conceive at a single service whether the right or left ovary functions; Fig. 8 would fail to conceive if bred when ovulating from the ovary corresponding to the non-pregnant horn, and conception would be uncertain when bred at the time of ovulation from the other side. The placentæ of Fig. 7 are even in contour and the tufts or villi are very fine, packed closely together and show a delicate, velvety surface, while in Fig. 8 they are rough, coarse, uneven and clumpy.

The fœtal membranes illustrated in Fig. 9 represent the maximum of uterine injury in which conception is possible, and the production of viable young is impossible. That is, there remained sufficient vitality in the placenta-forming tissues of the uterus for a fertilised egg to become located and obtain an extremely precarious nutritive supply for a brief period, but a wholly inadequate amount to supply nourishment sufficient in either quantity or quality to produce a viable calf. No healthy caruncles

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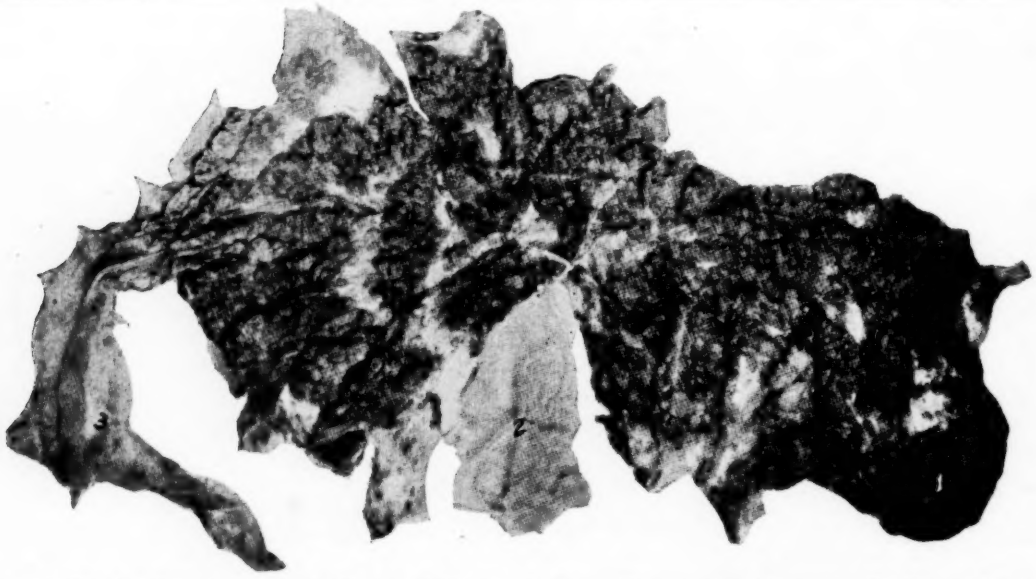

Fig. 9. *Allantois-Chorion from a Hopelessly Damaged Uterus.* 1, dome-like non-gravid cornu ; 2, the amnion at the middle of the gravid horn ; 3, prolongation of the gravid cornu of the chorion which had occupied the ovarian pole of the uterus. Prior disease had destroyed completely the endometrium in this region ; repairs having been made by the formation of scar tissue, utterly devoid of placental function.

The illustration demonstrates the extreme limit to which a uterus may be damaged by disease, and repairs be made, through the production of adventitious placental tissue, which may render conception possible. But the power of recovery is insufficient for the production of viable young. The next, and final stage of disease is the total destruction of the endometrium ; then in my experience, the cow ceases menstruation. The record indelibly engraved upon this allantois is : 1. The endometrium has been so completely destroyed in the non-gravid horn that the chorion failed to penetrate it except at the base where it forms a dome-like protuberance. The fœtus was thus deprived of any possible nutrition from this horn except at its base. 2. The endometrium at the ovarian pole of the pregnant horn, 3, has been completely destroyed and remains functionless. The chorion in this area is merely a diaphanous membrane, without nutritive value. 3. The cervical pole of the gravid horn has lost all its caruncles but the endometrium has retained sufficient vitality to enable it to produce some frail adventitious placental growths which sustained fœtal life for a time. The adventitious tissues are incapable of sustaining fœtal development sufficient for the production of viable young.

The reproductive life of the animal was definitely terminated by intrauterine disease. There could be no true cure of the sterility. Should the animal conceive, abortion could not be prevented by the agglutination test, by the use of living or dead abortion bacilli or by any imaginable means.

remain after the havoc caused by pyometra at the close of the prior pregnancy. The uterine mucosa of one horn has been completely destroyed and the cavity closed so that in the illustration it is represented by a dome-like projection (1) which barely entered the base of the horn. At the ovarian end of the other horn, the placenta-forming tissue has been destroyed but the cavity of the cornu remains open, and there has projected into it a slender diaphanous prolongation of the membrane (3), devoid of function. Only the base of the pregnant horn and the very short, dome-like base of the non-pregnant horn, were able to produce some frail, extremely imperfect adventitious placental growths, incapable of supplying adequate nutrition or protection. The adventitious tissue consisted almost wholly of masses of weak, non-resistant blood vessels, from which blood in large quantities escaped from the vessels lodged within them; rendering the entire placental mass a deep black colour.

These show briefly the fundamental importance of a healthy uterus, and the absolute necessity of perfect placental structures for physiological reproduction. A cow with fœtal membranes, like Fig. 7, mated with an equally healthy bull, calls for no treatment for sterility and demands no vaccination or isolation to protect her from contagious abortion; Fig. 8 illustrates a cow which needs to be prudently handled in order to have her produce (with considerable uncertainty) viable calves; Fig. 9 illustrates a case in which no known remedy for sterility and no isolation or vaccination against contagious abortion, or the use of any known sterility or abortion "cures" or nostrums can possibly restore breeding power—the breeding life of the animal has irrevocably ended.

The placental circulation, through the medium of which nutritive and waste substances are exchanged between the mother and her young, constitutes one of the most intricate and interesting examples in the circulation of the blood in animal life. The two placental systems of vessels, maternal and fœtal, lie in intimate contact, and through their extremely thin walls all nutritive and waste substances must pass between the pregnant female and her intrauterine young. The bounteous supply and intricate arrangement of these vessels may be visualised best by studying Figs. 10 and 11. The arteries, veins and blood cavities with which the terminal capillaries communicate are

Fig. 10. *Vascular Allantois of Mare.* The non-vascular, endodermic layer has been stripped off to show the intricate vascular network. 1, arterial trunk; 2, venous trunk; 3, ultimate arterial and venous trunks, giving off sinusoidal, or cavernous vessels, without themselves visibly decreasing in size; 4, secondary venous trunk; 5, a sinusoidal vessel, passing from artery to vein; 6, a very slender, non-branching artery. As shown in the illustration, the placental villi are diffused over the entire chorionic surface instead of being concentrated in certain areas as in ruminants. Disease of the uterus in solipeds is revealed upon the chorion by means of highly inflamed areas, by patches devoid of villi because of necrosis and by more or less extensive necrotic areas of varying colour, &c.

most readily illustrated in the vascular allantois-chorion of the mare as indicated in Figs. 10 and 11. Disease in the terminal capillaries of these vessels soon involves the entire circulatory system of the placenta, deranges the functions of all the vessels, leads to aneurisms and various diseases of their walls, diminishes the nutritive supply, halts the growth of the fœtus and menaces its health.

The influence of uterine lesions upon the health of the pregnant female and her intra-uterine young is vividly illustrated in Figs. 12 and 13. In Fig. 12 is illustrated an enormous distention of the uterus from dropsy of the amnion and allantois. The pregnant horn of the uterus (1) is tremendously enlarged; uncoiled it would be longer than the body of the cow. In Fig. 13 it is shown that the left, non-pregnant horn (2) has no caruncles. These had been destroyed in connection with some prior pregnancy. This rendered the horn functionless. Unlike Figs. 8 and 9 the non-pregnant horn (2) is enlarged almost to the size of the pregnant horn. It is a passive enlargement due to the mechanical pressure of the liquids. Similar conditions are sometimes encountered in extensive pyometra, the two horns being distended approximately alike. So far as now known, dropsy of the amnion and allantois always has extensive and serious lesions of the placental tissues of the uterus as its background. The lesions are not always the same. Dropsy of the amnion-allantois is common in badly raised heifers in first pregnancy, like those in Group C, Table IV, page 756 (*V.R.*, July 2nd). The lesions are then not the result of a prior gestation, but are a part of the existing pregnancy owing to the weak, imperfectly developed uterus. The principle involved is: so far as is yet known, dropsy of the amnion and allantois is uniformly the consequence of extensive and serious uterine disease.

The examination of the afterbirth of cows and mares affords the most secure basis yet discovered for the determination of the state of health or disease existing in the uterus at the close of pregnancy. It authentically reveals the past breeding history of the animal and the

Fig. 11. *Vascular Allantois of Mare.* Prepared as Fig. 10 to illustrate the richness of arterial anastomoses near the median line of the greater curvature opposite to the mesometrial attachment. 1, 2, arterial trunks; 3, ordinary and 4, multiple anastomoses. Figs. 10 and 11 show more clearly than can be accomplished by any known technique which may be applied to the chorion of the cow to demonstrate the abundant blood supply of the placenta. Such placental circulation is fundamentally requisite to the proper growth of the fœtus. Any interference with such supply endangers the nutrition and health of the fœtus.

state of the uterus at the time when the placenta separated from it. In Fig. 8 it shows that the cow is an unsafe breeder and that her calves ordinarily will not prove typically healthy; Fig. 9 shows definitely that the cow can never successfully breed; and Fig. 13 indicates that the cow, had she recovered from the dropsy of the amnion and allantois, had only one-half the normal uterus, could not possibly conceive in the left horn, and conception in the right horn would be frail, an excessive load would fall upon the one horn, and seriously menace alike the cow and her fœtus.

Like most means upon which to base a diagnosis and prognosis, the value of the record revealed by deciduæ lies in careful and conscientious study of them. The determination cannot be made by rolling the afterbirth about in the gutter with a stable fork or by other high-speed-careless gestures. A definite technique is to be scrupulously followed.

THE EXAMINATION AND HANDLING OF THE PUERPERAL FEMALE

The state of the pregnant uterus can be determined only to a limited degree until gestation has closed and, with the fœtus and its membranes out of the way, the interior of the uterus is available for direct examination. While as already stated, the proper study of the fœtal membranes authentically reveals the state of the uterus, more reliably than the examination of the organ itself, the afterbirth is not always available.

RETAINED AFTERBIRTH

In dairy cows, retained afterbirth is a vexed question. In the preceding pages certain principles of sex hygiene have been advocated which will go a long way to prevent its occurrence. When prevention has failed, highly satisfactory cure is impossible. Many methods of handling are recommended, but no plan has won the position of an accepted standard. The recommendations are as wide apart as the poles. Some advocate the early manual removal, although in many cases it is irremovable. Others go to the opposite extreme and leave it alone. Each case is an individual problem, always obedient to fundamental principles of pathology but modified by the extent and virulence of the disease present. Two fundamental principles should control the efforts.

(1) The membranes are dead tissues, subject to putrefaction, and should be removed from the uterus at the earliest practicable date. It should be kept in mind that the tearing away of the contiguous chorion and leaving behind the placental or cotyledonal area over one or more uterine cotyledons is not the removal of the placenta. It should be equally remembered that when a portion of the membranes at the apex of the gravid horn is irremovable, the tearing away of the major part and leaving the apex to putrify, is by no means the removal of the afterbirth. It is doubtful whether the remnant will come away as early and favourably as it would have done had the other portions been left to keep the cervix open and to exert gentle traction upon the irremovable part.

(2) It is perhaps generally admitted, at least it seems difficult to controvert, that pending the expulsion or removal of the afterbirth all available means should be applied to repress putrefaction. I have favoured iodiform-bismuth-oil; others advocate charcoal and other substances. Their efficacy will depend upon the virulence of the disease processes, and the skill and attention used in handling. No remedy is ideal. Retained afterbirth leaves an indelible mark, and its effect upon the breeding health of the animal will vary with the virulence and duration of the disease process, the skill in

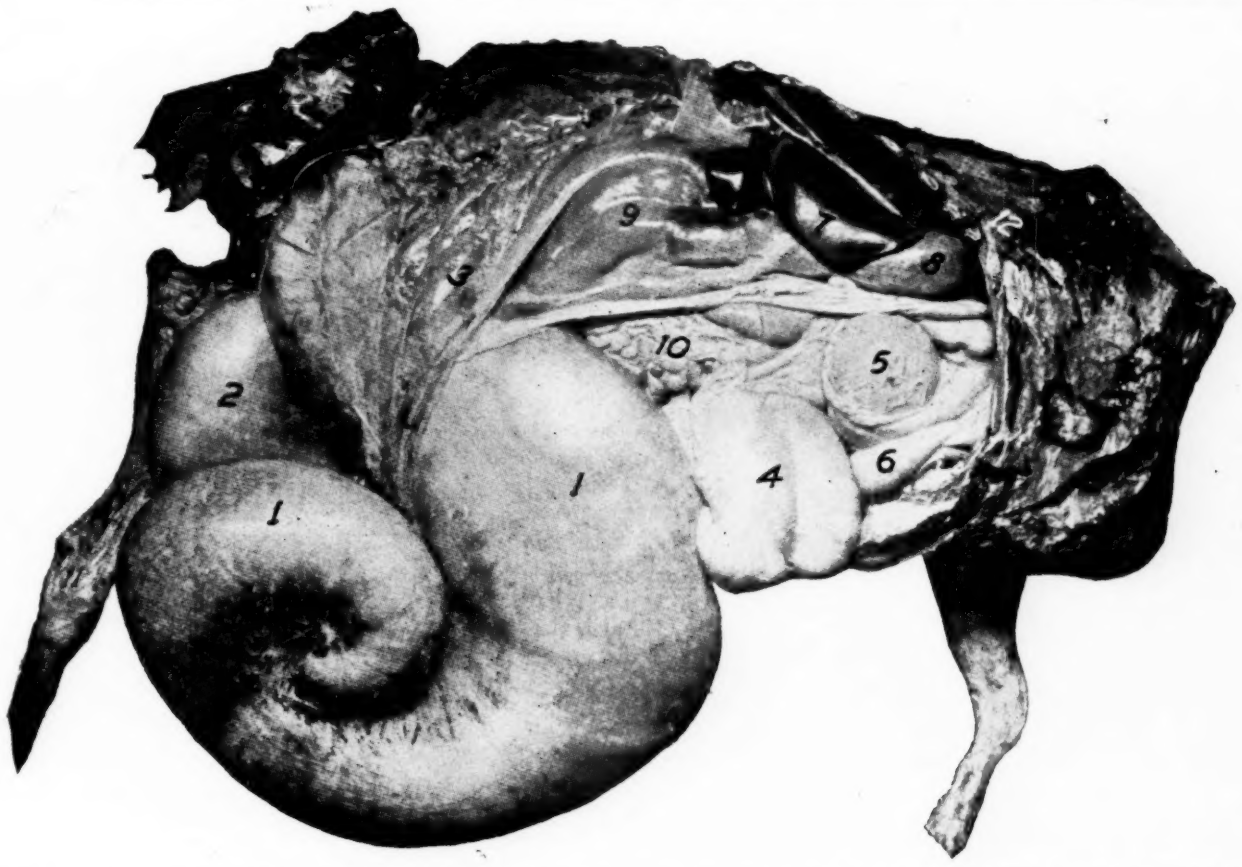

Fig. 12. *Abdominal Viscera of Cow Showing Extreme Hydrops of the Amnion and Allantois.* 1, right (gravid) horn, 12·5-ft. long upon its greater curvature; 2, ovarian pole of non-gravid cornu lying upon the left hind leg; 3, mesometrium; 4, the empty rumen, displaced far forward; 5, omasum; 6, abomasum; 7, liver; 8, gall bladder; 9, large intestine; 10, small intestine; 11, left tarsus; 12, sixth right rib. (Cornell Veterinarian).

handling, and other pertinent forces. One of the most common and unfortunate errors is the current attitude that once an afterbirth has been removed, the case is completed and the animal convalescent. Retained afterbirth is not a disease of the afterbirth but of the uterus, and the removal of the placenta has its principal advantage in the fact that it uncovers the diseased endometrium and renders the endometritis more accessible to local treatment.

The expulsion of the afterbirth leaves the entire placental area of the uterus denuded of protective epithelium. Bacteria or viruses are commonly present, although in ordinary pregnancy they have done no important injury. The dilated and abraded birth canal invites infection from without. When uterine disease follows the close of pregnancy, the more common types of bacteria or contagion within the uterus may be of either intrinsic or extrinsic origin. Puerperal tetanus occurs with sufficient frequency to indicate that extrinsic infection sometimes enters through the birth canal.

In the preceding pages I have definitely advocated an extended rest period between pregnancies upon the ground that it adds security by allowing ample time for the uterus to overcome infection present, to complete the process of involution and resume the physiological non-pregnant state. Observation teaches emphatically that mere rest (letting things alone) often fails to restore the genital system to an ideal state of health. Having this in mind, the question of prudent interference arises; in this field there is ample room for wide divergence of opinion. The current attitude is, that when genital disease thrusts itself forcibly upon the attention of the observer, it should be noted and, if in his judgment spontaneous recovery is improbable or impracticable, interference is to be considered. The opposite view, in the extreme, is that adequate effort be made to determine the presence or absence of disease without awaiting profound superficial evidences of important pathological processes within the uterus or other organs. When such search is made in dairy herds, it is found that a large proportion if not a great majority of puerperal cows reveal definite evidences of uterine disease. This having been determined, the problem inevitably arises if it were not better, at least in some dairy herds, to go yet one step further and make an effort to forestall puerperal disease through preventive measures. In human obstetrics the

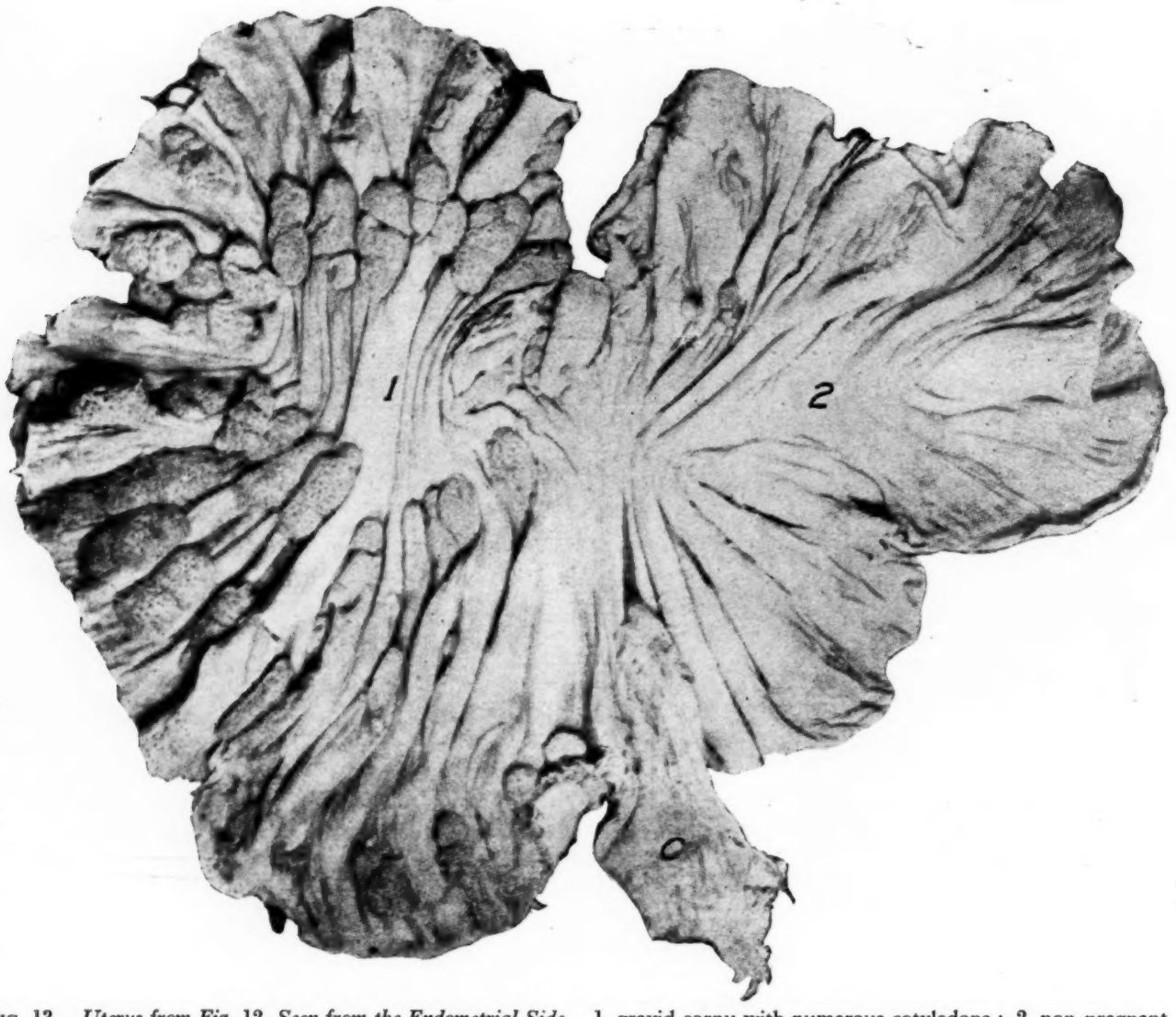

Fig. 13. *Uterus from Fig.* 12, *Seen from the Endometrial Side.* 1, gravid cornu with numerous cotyledons ; 2, non-pregnant horn almost devoid of cotyledons ; 3, cervix. Figs. 12-13 serve to illustrate the highly important truth that uterine and fœtal diseases are parallel. Clinical evidence exists on every hand that a diseased uterus inevitably leads to fœtal disease if pregnancy occurs, and any disease of the endometrial side of the chorion of the fœtus indicates unerringly that corresponding disease exists in the endometrium. It is just as natural that a damaged uterus should lead to hydrops amnii, hydrocephalus, or other type of monster, or to dystocia or retained afterbirth, &c., as it is for a healthy uterus to produce a vigorous, healthy fœtus at full term without difficulty. A fœtus within a diseased uterus can pursue only a pathological course and reach a pathological end ; only a healthy uterus can produce physiological young.

preventive measures are primarily concerned with the prevention of invasion by extrinsic infection. While it doubtless does much to reduce, it does not eliminate puerperal infection in woman. In dairy cows, as well as in other breeding animals where the laws of sexual health are scorned, intrauterine disease is a prevailing accompaniment of pregnancy and the bacteria or viruses are not deported when the fœtus is expelled. There is abundant and reliable evidence that bacteria or viruses may be present in the pregnant uterus without causing notable injury but acquire pathogenic power when the uterus has been denuded of its protective epithelium and has been profoundly fatigued by labour.

As resident veterinarian I have had opportunity for constant and detailed observation in breeding studs and registered beef and dairy cattle. I have found that in cows a detailed examination of the puerperal uterine cavity often reveals extensive disease which is not accompanied by any extrinsic signs; there is no elevation of temperature, no visible loss of appetite, no extraordinary genital discharge or other signs of genital disease. I have elsewhere described and illustrated a typical case involving extensive œdema of the chorion in a cow. So far as the owner could observe, her puerperal period was perfectly healthy. She again conceived without delay. At near the close of her term she suddenly died because of rupture

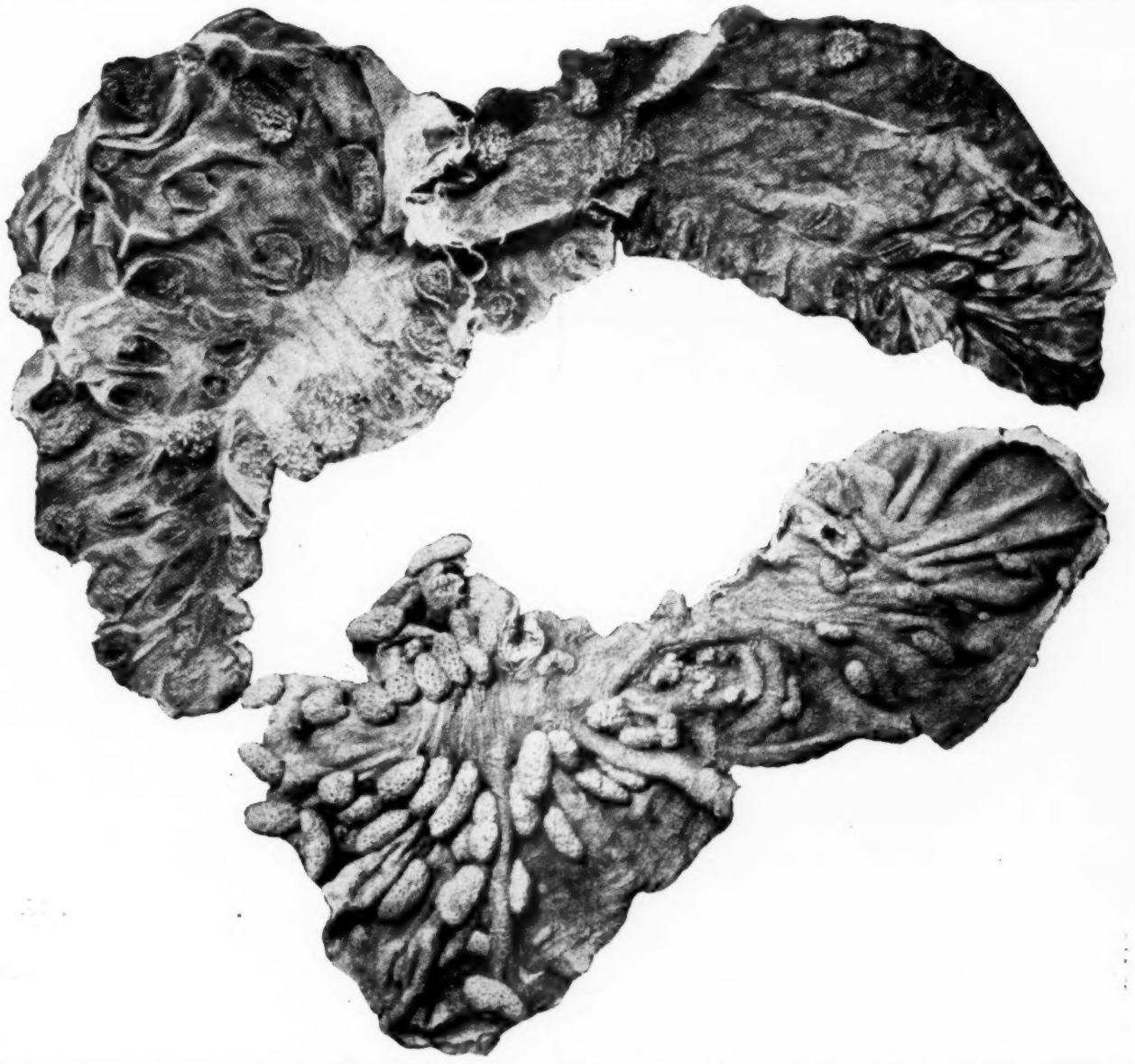

Fig. 14. *Gravid Uterus and Chorion from an Abattoir Cow.* This uterus, with the chorion, shows clearly that extensive damage had occurred in connection with a prior pregnancy, but sufficient repairs had been accomplished that she was well advanced in pregnancy at the time of slaughter and was apparently competent to produce healthy young under favourable conditions. Under unfavourable conditions her pregnancy would be in jeopardy and might end in abortion, dystocia, retained afterbirth, &c.

The illustration is given in order further to emphasise the fact that upon the chorion is indelibly written an authentic history of health or disease of the uterus up to the time of the expulsion of the afterbirth. Although the uterus (lower figure) is somewhat contracted and disordered due to imperfect preparation, it is obvious that the chorion is a faithful replica of the uterus. In the uterine horn at the left are 35 fairly perfect caruncles ; in the corresponding cornu of the chorion are also 35 cotyledons of the same size and arrangement. In the horn of the uterus at the right, which has been badly damaged in connection with a prior pregnancy, only 13 imperfect caruncles are visible ; the corresponding horn of the chorion contains but 13 equally defective cotyledons. The anatomical arrangement of the caruncles and cotyledons is clearly demonstrated in the horn of the chorion at the left, but the uterus was less carefully arranged and while the four rows are recognisable, they are less clear.

of the uterus due to an extreme œdema of the chorion. The autopsy revealed that all caruncles had been destroyed in one horn, the same as is shown in Fig. 13. The evidence was clear that this injury had occurred at the close of her first pregnancy without having caused any external symptoms of a character to attract the attention of her owner, a highly intelligent farmer. Abundant cases of similar character occur and raise the important question of the prudence of making examinations of the uterine cavity following the termination of pregnancy and applying any available preventive measures. Such a course is clearly impracticable in a large proportion of domestic animals. In registered cows and mares of high value, especially where sexual disease of a virulent type is prevalent, the regular examination of

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the uterine cavity and the application of prophylactic handling may well assume definite economic value. In my experience as resident veterinarian, the universal application of preventive measures immediately following the termination of pregnancy has proved of great economic value; has definitely reduced the virulence and prevalence of genital disease; has increased the fertility and the security of gestation; has decreased the difficulties of labour, and has raised the quality of the offspring.

My plan in cows has been to introduce a little warm physiological salt solution into the deepest portion of the uterine cavity, through a long, soft rubber catheter. The external end of the catheter is then compressed and lowered to the floor or ground, the compression released and the uterine contents syphoned out. That accomplished, bismuth-iodoform-mineral oil was introduced. The high specific gravity of bismuth and iodoform causes them to fall down to the lowest part of the uterus, in the area of greatest accumulation of exudate, and without causing irritation, slowly to decompose in the presence of bacterial activity. Similarly, mercurochrome, 2 per cent. in lanolin, and enclosed in gelatine capsules, may be deposited in the deepest part. Other substances probably possess equal value.

Summary

Reviewing briefly the thoughts submitted regarding the pathology of reproduction, it is urged that the prevention of genital disease be based upon the fundamental laws of sex hygiene. No era of life is free from dangers to the function of reproduction. There are certain points in the lives of breeding animals where the menace to genital health is especially notable. At these points protective measures should be concentrated.

(1) Physiological reproduction demands the mating of two sexually healthy and vigorous individuals.

(2) The new-born animal must be kept in the highest attainable state of health during the developmental period of its reproductive system. This applies with special force to dairy calves that are artificially fed.

(3) The young animal should not begin breeding until it has reached sufficient maturity that it has ample reserves of nutrition and strength safely to carry the burden of reproduction. In the females the reserve strength and vigour should be not only sufficient to bear the load under expected conditions, but an ample margin of safety should be provided against unpredictable stresses—bad food, inclement weather, etc.

(4) The male, like the female, should not be asked to assume a sexual burden of a character to menace his fertility. His fertility should be watched closely by means of examinations of his spermatozoa.

(5) The female should be granted ample time for complete recovery and rest after the termination of a pregnancy before causing her to resume the burden of gestation.

(6) The puerperal female should have the most skilful and abundant oversight which her economic value will justify.

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Bain, D.
Bannister, P.
Beattie, G. S.
†Brownlie, W. M.
Dent, W. G.
Drummond, J.
Ferguson, H. N.
†Ford, R.
†Gledhill, A. W.
†Harris, S. T.
Henderson, W. M.
Jobson, K. M.
Kellas, H. N.
Littler, S. B.
†McIlroy, W. J.
Matheson, R. C.
Milne, J.
O'Neill, R. J.
Pasfield J. A.
Roberts, D. T.
Sahni, D. R.
Serebrisky, B.
Skea, A.
Thomson, P. D.
†Wilson, P. J.
†Wright, J.

* Denotes 1st class honours.
† Denotes 2nd class honours.

Class B.

†Adams, A. J.
Anderson, A. H.
Binns, H. R.
Chalmers, A. W.
Chappel, C. N.
Elmslie, J. K. S.
†Fiennes, R. N. T. W.
Forbes, G. S.
†Gambles, R. M.
Gill, A. W.
Guthrie, W. J.
†McDougall, K. D.
*Mackay, John.
*Mackie, G. M.
*McKinnon, J. A.
McLeish, E. W. F.
Macmaster, D. B.
McWilliam, James
Pearce, J. W. R.
†Roberton, A.
†Rorrison, J. M.
†Shepherd, A. M.
Smith, J. K.
Simpson, J. W.
Suttie, J.
†Thompson, W. J.
Wilson, S. G.
Withers, A. R.

Class C.

Aimer, D. R.
Alexander, J. A.
†Durham, G. A.
Fraser, J. M.
Graham, James.
Hall, R. F.
Inglis, J. S. S.
Kelly, A.
Lancaster, W. E.
McDonald, D. H.
Mair, A.
Prentice, E. G.
Simpson, William.
Ross, J. M.
Ross, R. W.

Class D.

Addison, F. H.
Baird, Peter.
Barton, W. F.
Blanchard, J. H.
Fairweather, G. B.
Forrest, W. B.
Fraser, F. G.
Hardy, F. B.
Jennings, Sydney.
McNabb, Thomas.
Macrae, D. R.
Mangrulkar, M. Y.
Pickering, J. P.
Sutherland, G. N.
Wilson, W. L.

* Denotes 1st class honours.
† Denotes 2nd class honours.

(To be continued.)

NATIONAL HORSE ASSOCIATION OF GREAT BRITAIN

At a recently-held Council Meeting of this association, consideration was given to the desirability of giving evidence before the Lotteries Commission. As this Commission has been set up to enquire into betting, etc., and the terms of their enquiry would cover investigations of the Racecourse Betting Control Board who, from time to time, have to apply monies comprised in the totalisator fund for purposes conducive to the improvement of the breeds of horses, the Association decided to ask that a representative might be received to give evidence on this subject.

The Fell, Dales and National Pony Societies submitted the position of the Fell and Dales Pony breeds now that the Government grants had been withdrawn. These grants amounted to £750 in all, and as a consequence of their withdrawal, practically all the pure-bred stallions had been castrated, while the young colts were not being kept entire. It was further pointed out that there would be no necessity for the importation of Russian and other foreign ponies if some assistance could be obtained, there being a good demand for pure-bred ponies for all kinds of general work. Various Members of Parliament

had interested themselves in the question, and the full facts had been conveyed to the Government.

The Secretary reported that at the request of affiliated Societies, a considerable amount of information as to Foreign Government encouragement of horse breeding had been collated. The Council were interested to learn that in Italy, L29,000,000 had been expended over a period of years, and that the Government boarded out 4,000 mares and maintained 8 stallion depôts. In Germany, stud farms were subsidised by the Government, 2,300 state-owned stallions for light horse breeding being maintained, and that a proportion of the betting tax is earmarked for horse breeding. Sweden allocated 800,000 kronen (£40,000) for horse breeding, while in France 58½ million francs were voted in 1932; 3,322 stallions and 60 mares being maintained. Great encouragement is also being given to horse breeding in Hungary, Czecho-Slovakia and Spain.

Sir John Moore, elected Chairman of the Publicity Committee, reported that since the commencement of the Publicity Campaign (1928) 2½ million pamphlets had been issued, mainly dealing with horse transport. 1,200 copies of the Horse Owners' Reference Book for 1932 had been issued, and that there was a steady demand for this book. The question of issuing a book on Horse Management was under consideration.

A report was received from Mr. Cecil G. Argles, Chairman of the Slippery Roads Committee, indicating that he had inspected road surfaces in Oxfordshire, Gloucestershire, Hereford, Wiltshire, Devonshire, Somerset and Northamptonshire. Distinct improvements were noticeable in all counties, attributable to the use of larger-sized chippings for binding. In South Devon it was now difficult to find any road that had not a reasonably good surface, due to the use of ¾-in. Cornish granite chippings. Excellent roads had also been laid in Northamptonshire and Gloucestershire.

* * * * *

MINISTRY AND RECENT CATTLE DISEASE OUTBREAKS

The Ministry of Agriculture has notified the Berkshire Farmers' Union that a special investigation has been made regarding the puzzling disease which caused the death of many cows in the county.

The senior veterinary inspector of the Ministry expressed the opinion that the disease was attributable to a deficiency in the foodstuffs harvested last year under bad conditions.

The Ministry recommend as a preventive measure an addition of two ounces of calcium phosphate to the food ration and bean meal.

* * * * *

The Recorder at Bridgwater Quarter Sessions, referring to the number of motoring accidents, remarked that animals, as well as human beings, were beginning to acquire the "road sense." He noticed that dogs and sheep had learnt it, but cows did not appear to have done so. Perhaps they were not on the road often enough.

* * * * *

Sightseers at Upton Zoo, Chester, recently witnessed what appeared to be the deliberate suicide of a monkey. The monkey first amused the visitors by gnawing off 6 ft. of rope hanging in his open-air cage. He carried the rope to a tree in the cage, and tied one end of the rope to a bough. The other end the monkey made into a noose, into which he inserted his head with great deliberation. He pulled tight the slip-knot, climbed as high as the rope would allow, and launched himself off the tree. Death was instantaneous.

Clinical Communications

CALCIUM THERAPY AND MILK FEVER

J. F. D. TUTT, M.R.C.V.S.
Winchester

The following is a record of cases of milk fever treated by the injection of calcium gluconate, on the lines recommended by Mr. Hepburn, F.R.C.V.S., in the issue of the *Veterinary Record* for April 2nd, and which were alluded to in my communication in the *Veterinary Record* for June 25th:—

1. Roan Shorthorn Cow.

There was no history of an antecedent attack. This attack occurred at the 5th calving. Her case was interesting from the sterility standpoint, in that I was asked to examine her last year, as the owner stated that she had not been in œstrum. On rectal examination I found a corpus luteum in the left ovary, which I expressed without much difficulty. When visiting the premises, five weeks later, I was told that she had not been in œstrum, and on further examination I found that there was a corpus luteum in the right ovary—this I did not interfere with, as I was satisfied that the ovaries were functioning and, there being no evidence of uterine or fallopian tube disease, I considered that this was a case of "silent heat" and advised turning her out with the bull. This was done, with the result that she became pregnant, calved to full term, and went down with milk fever.

Prior to my being called in, the stock-man had twice inflated the udder with air, but although this produced a return to a semi-conscious state, the cow did not get better. I therefore injected calcium gluconate into the side of her neck, and had the injection site fomented and massaged for 20 minutes. The injection was given at 9.30 a.m. and on my calling again at 2.15 p.m. I found that the cow was normal, on her feet, and cudding—the stock-man stating that she had got on her legs within two hours of injection. No relapse occurred. I could find no evidence of swelling, nor was there any until about four days later. This still persists (treatment was carried out on April 11th), and is about the size of her udder. The owner will not allow surgical interference, as the cow is a heavy milker, is giving seven gallons of milk per diem, and is one of the "temperamental" type in that the mere giving of a drench makes her "sulk," and fall off in her milk for days.

2. Guernsey Cow.

This cow had an attack of milk fever at her last calving and was treated by the intravenous injection (jugular) of calcium chloride (10 per

cent.) without any untoward effect. She was an old cow and her exact number of calvings was not known.

This cow had the calcium gluconate treatment on April 1st, and has had no swelling.

3. Guernsey Cow. Third calver.

This cow was found unconscious in the morning by the herdsman, and was seen by me at 6 a.m., 10 a.m. and 4 p.m., and on each occasion she received calcium gluconate subcutaneously. There was no response, and at the request of the owner her udder was inflated with oxygen at 7 p.m. She was up at 11 p.m. and had no further relapse.

4. Friesian Cow. Number of calvings unknown.

This cow's udder had been inflated with air by the stock-man. When seen, 48 hours after calving, she was still comatose. Calcium gluconate injection was carried out, and she was up in five hours. No relapse. No swelling.

5. Guernsey Cow. Fourth calver.

This cow belonged to the same owner as No. 3, and he left orders that udder inflation was to be given. This instruction I ignored, as one does not usually tell one's doctor what pills he is or is not to prescribe, and carried out calcium injection, with the same experiences as in the other case, finally having to resort to udder inflation, with recovery—the owner then arriving and telling me that this should have been done at the start, and that he did not want any more "northern experiments" that he had read about in the livestock papers! Fortunately, he was an old friend!. Luckily, too, neither has had any swellings!

6. Shorthorn Cow. Sixth calver. Previous history not known.

This cow was not a bad case when first seen, but in spite of one injection of calcium gluconate she became unconscious during the six hours after injection, and udder inflation had to be resorted to, with complete success. There was a slight swelling, which persisted for about 10 days.

7. Shorthorn Cow. Fourth calver.

This cow was stated to have had an attack at her last calving, and very soon got right, When seen this time, she was in a very bad way. One quart of calcium gluconate was injected subcutaneously, and the site of injection, as in all these cases, was fomented and massaged for 20 minutes. Although this cow recovered from milk fever, she never regained her feet, and as an enormous swelling followed, over the site of injection, she had to be destroyed.

8. Shorthorn Cow. Third calver.

This cow was found and treated early, with calcium gluconate. She was not down but staggering round the box. A large abscess (requiring surgical treatment on two occasions) formed at the site of injection.

9. Cross-bred Shorthorn and Guernsey Cow. Seventh calving.

This cow showed signs of milk fever 96 hours after a calving at which she required my assistance (breech presentation). Calcium gluconate treatment was adopted. Paralysis of hind quarters persisted for three days, after which she made a good recovery. No swelling.

10. Shorthorn Cow. Fifth calving.

This cow presented symptoms similar to Case No. 8. She recovered, but three days later was unable to get up and developed an enormous swelling similar to Case 7. This was opened, and a considerable amount of pus, of a very offensive nature, evacuated. The cow died shortly afterwards.

11. Pedigree Shorthorn Cow. Fifth calver.

No history of a previous attack. Normal calving. Calcium gluconate injected. Swelling involving injection site, and down to her brisket followed, but subsided in five days.

This was a mild case of milk fever.

12. Jersey Cow. Aged.

This cow had milk fever two years beforehand, but only one inflation of oxygen was necessary on that occasion. In this particular case this year, she had to receive, at intervals, no less than four injections of calcium gluconate, and finally an udder inflation of oxygen, as she had no fewer than five attacks or, shall I say, "relapses." A large swelling developed on the near side of her neck, and this I had eventually to open, removing a large quantity of offensive pus and dead tissue. She is making a good recovery.

13. Shorthorn Cow.

The number of previous calvings was not known. This was a mild case and the owner, having heard of the new treatment, asked for it. One injection was carried out, and was followed by a large swelling which had to be opened on two occasions; on the second a large quantity of dead tissue was removed.

14. Shorthorn Cow. Fourth calver.

No previous attack. Mild case. One injection of calcium gluconate. No subsequent swelling.

15. Cross-bred Cow. Third calver.

Mild case. One injection of calcium gluconate. No swelling afterwards.

. . . . .

It will be seen from the foregoing 15 cases that, in eight of them, a swelling followed the injection, and that one died and the other had to be destroyed.

These are the cases which I have followed up and made the subject of enquiry, or con-

cerning which I have had complaints made to me respecting the after-effects. There are others which I have not followed up, and having had no complaints, conclude that all is well, but perhaps I may hear more when I re-visit the premises.

In none of these cases have I had actual sloughing, but I have had sloughing in the past with this preparation when it has not been filtered, and I decline to believe that filtering is not necessary

From correspondence received privately from practitioners, whom I wish to thank for writing me, it would appear that the consensus of opinion is similar to my own findings, and that although with other preparations—such as calcium dextrose—there is no actual sloughing, recovery is by no means so prompt as with udder inflation, or from the intravenous injection of calcium chloride.

It has been suggested by one, that the probable explanation of the fatal termination of cases in which calcium chloride is injected into the milk vein, is that the vein is very much larger than the jugular, and that the blood flow is not so rapid, with the result (confirmed by *post-mortem*) that coagulation of the blood takes place at once.

When I first criticised the treatment of this condition by injecting calcium gluconate, Dr. Greig very kindly offered to examine blood samples from my cases, as he was inclined to doubt that my cases (especially the fatal ones) were milk fever, and in every sample which he examined he was able to find a deficiency in the blood calcium. In the fatal cases he was also able to note a rise in the blood calcium. Unfortunately during clearance of old records, the records of these cases were destroyed, but I am mentioning this fact as some doubt has been cast on his work and that of Dr. Dryerre, and whether or not it is ultimately shown that this calcium deficiency is a cause, or a result of milk fever, credit is due to them for first noting it.

I am inclined to think that the trouble may originate in the liver cells, owing to the pathological appearance of the liver in fatal cases. A practitioner, whose name for the moment I have forgotten (but I hope if he reads this article he will write to this paper) wrote me a long time ago, pointing this out, and giving his views, and I should like him now to record them. Has any practitioner or investigator ever taken from a bad case of milk fever, some of the milk, freshly drawn from the udder, and injected it at once into the udder of a normal cow? If so, has he been able to produce the disease?

The arguments in favour of the injection treatment of milk fever as better than udder inflation, are mainly that the udder is not interfered with, and further that the stock-man or owner cannot carry it out.

Providing the udder is first stripped clear of all milk, and the quarters then tightly inflated with oxygen or air, the majority of cases will get better with the one inflation. Relapses are often due to milking out too soon after recovery from the attack.

In my experience, one or two inflations do not cause a drop in the milk yield, but three and onwards will.

Some few years ago I mentioned the value of an intravenous injection (jugular) of adrenalin chloride (Parke, Davis) in bad cases, and those who hesitate to use calcium preparations can with safety use this preparation.

I can fully confirm Mr. Little's views on the value of calcium chloride; I have only relinquished it because of the bad results obtained by that mode in this country, in spite of similar views and thanks sent me by practitioners who wrote me regarding it, when I first commented on it in this paper. In the current issue of the pamphlet issued by the Nordern Laboratories, the following communication on magnesium chloride in calcium therapy for milk fever, is of interest. The writer points out that a significant advancement in calcium therapy is the addition of magnesium chloride to calcium chloride. Not only is the toxicity of calcium upon the heart practically eliminated thereby but, according to Becka, it reduces calcium metabolism and aids in the retention of calcium in the system. Investigators, it is pointed out, have stressed the importance of an examination of the heart when treating parturient paresis with calcium preparations. Concerning the use of calcium chloride in the treatment of milk fever, Sjollema, Seekles and Vanderkaay reported in 1930 that the use of calcium chloride solutions alone in many instances showed a toxic and depressant action on the heart following its administration. They noted in cases of milk fever that where the heart was irregular before the administration of calcium preparations, in some cases the intravenous administration of calcium chloride resulted in fatality. In my experience, the only cows that died were three in which the injection was made into the milk vein, and I must confess that I have never examined the heart before treating these cases with calcium preparations. The same observers noted that in a certain percentage of the cases, where the heart was apparently normal, the administration of the product was followed by irregularity. In some instances the frequency of the heart beat was greatly increased, followed by an arythmic beat, and then a pronounced slowing. In some cases the animal died with the heart in systole. With the addition of magnesium chloride to the calcium chloride no irregularity of the heart,

either during the administration or following, occurred in 17 of 24 clinical cases of milk fever where the heart was apparently normal before administration of the calcium magnesium preparation. In six of the cases there was a slight irregularity following administration of these chemicals, which lasted one or two minutes. Of these 24 so treated, there were only two instances wherein it was necessary to re-treat animals with the preparation. In the cases which I treated with calcium chloride (10 per cent.) alone, my percentage of cases requiring more than one injection was less than 2.

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TREATMENT OF ECLAMPSIA AND CONVULSIONS IN CATTLE

J. W. POLLOCK, M.R.C.V.S.
Helmsley, Yorks

During the last few weeks there have been a few observations and letters in the *Veterinary Record* on the diseases of the nervous system of cattle. I venture to give my treatment of these diseases, which I have found to be satisfactory. In many of these cases, when the practitioner first sees one, he finds the cow standing stiffly on her legs with the hocks too straight or extended, grinding her teeth and salivating a little. Frequently on being handled the cow will immediately fall in a convulsion. During a convulsion a hypodermic injection of luminal (Bayer) is very useful in cutting short the attack. The writer has given 5 and 6 c.c. of a 20 per cent. solution for a dose. As soon as the mouth can be opened sufficiently 2-oz. of chloral hydrate in not more than 3 gills of water has an excellent effect and soon the cow will usually rest normally. In severe cases the writer usually follows up this initial dose of chloral with 1-oz. doses of the same drug every one or two hours, according to the severity of the case.

In one acute case in which the convulsions were almost continuous, a total of 8-ozs. of chloral was given during a period of eight hours. The cow slept peacefully for another six or eight hours, was soon on her feet and made a quick, complete recovery. But all cases do not recover so well. In some the convulsions are followed by paraplegia of the hind limbs, which the writer finds much more difficult to treat successfully than the convulsions—calcium lactate in large doses by the mouth (and also subcutaneously) and nux vomica, being chiefly used. In eclampsia inflation of the udder in addition to the chloral is also useful. As an initial dose 1-oz. of chloral for a large cow has not the desired effect. In those cases of milk fever which are restless and moaning a preliminary dose of chloral makes the operation of inflation easier and produces the desired sleep or drowsiness.

FREAK INTESTINES IN A PIG

J. WRIGHT CONCHIE, F.R.C.V.S.
Kidderminster.

When making a *post-mortem* examination of a pig on June 29th I met with a rather peculiar condition. After opening the abdomen I thought the bladder seemed to be rather distended, being about the size of the normal full stomach. Before using the knife further I made a careful examination and found the bladder, practically empty, lying on this distension. I then removed the abdominal viscera from the diaphragm to the pelvis and after doing so and when laid out the intestines appeared to have a stomach at each end. I incised the distended portion and the internal part had every appearance of a true stomach. At the proximal end was a constriction like the cardiac opening to the stomach and for a third of the distance from this the mucous membrane appeared like that of the cardiac portion of the stomach—there was a very definite line of demarcation, after which the mucous membrane took on the appearance of the pyloric portion of the stomach which finished up in a manner similar to the pyloric orifice of that organ where this part joined the rectum. I opened the stomach and spread this out with the distended portion of the bowel and the owner and herdsman remarked upon the similarity when we compared the two parts.

This is the first time out of innumerable *post-mortem* examinations of pigs, that I have met with such a condition. One might say that it was *a pig with two stomachs.*

This pig would not weigh more than 80-lbs. and the owner said that it had never done well, that it always appeared pot-bellied, and that pigs from the same farrow were slaughtered some time back and weighed over ten scores each.

I should have liked to preserve this specimen, but as the pig had been lying dead in the warm weather for some days and decomposition had set in this was not possible. I thought the recording of this might interest some members of the profession.

A "Dangerous Dog" Ruling

Before the Leeds Stipendiary magistrate (Mr. Horace Marshall) recently, Harry Cohen, 24, was charged with failing to keep his Alsatian dog under proper control. The evidence showed that the dog, though it never attacked any person, had frequently attacked other dogs in the street. The Magistrate said that he was not sure whether a dog was dangerous if it only attacked other dogs. It had been ruled, under the Act governing dangerous dogs, that a dog was dangerous if it attacked mankind, sheep, or poultry, but, so far as he knew, no definite ruling had been given that a dog was dangerous if it simply attacked other dogs. He ruled that a dog was dangerous if it attacked other dogs, and ordered Cohen to pay the costs and keep his dog under proper control.

XUM

Abstracts

[**The Action of Ergot Preparations on the Puerperal Uterus.** Moir, C. *Brit. Med. Jour.* No. 3,728. June 18th, 1932.]

Having found that, by the use of a sterilised rubber bag in the uterus, connected by water-filled tubing to a mercury manometer, very clear results were obtained in the study of the clinical action of the ergot alkaloids, the author decided to investigate the effect of other constituents of ergot, and of various pharmaceutical preparations of the crude drug. Ergot has been of the nature of a treasure chest to pharmacologists, but of the various bodies isolated only two (other than the alkaloids) were believed to have any appreciable effect on the uterus: these are histamine and tyramine, but experiments are detailed to show that, in point of fact, of the active constituents hitherto identified in ergot only the alkaloids ergotoxine and ergotamine are of clinical importance.

To contrast the effect of the active with the inactive ergot preparations, a watery extract of ergot was specially prepared in strict accordance with the regulations of the 1914 *British Pharmacopœia*. Judged by all previous work this preparation ought to have been inert, for analysis showed that it contained only a trace of alkaloid. It was with the greatest surprise that the author found that, far from being inert, this preparation surpassed by great measure the activity of any drug which he had previously used in the same manner; moreover, the effect appeared in a remarkably short time. In character the contractions were notably different from those due to ergotoxine or ergotamine: they were frequent (two or three to the minute), regular, of fairly great excursion, and there was a rise in the base line to an extent much greater than that observed with any other drug. In view of the pending change in the pharmacopœial regulations, it was of interest and importance to test the liquid extract which will shortly become official. The results showed that this extract has an activity of the type described to an extent as great as, and probably greater than, that of the 1914 liquid extract.

Inasmuch as the uterine contractions caused both by liquid and solid preparations of ergot were, with regard to time of onset, nature and frequency, in most striking contrast to those produced by ergotoxine and ergotamine, it can only be supposed that they were caused by an entirely different constituent of ergot. Since histamine and tyramine were found to be inactive when given by the mouth, either singly or in combination, it must be assumed that the oxytocic power of the liquid and solid extracts is due to a substance whose importance has hitherto been overlooked in the investigation of ergot; it can, indeed, be stated with reasonable certainty that the characteristic action of ergot known to the old obstetricians is due to a substance which is not ergotoxine, ergotamine, tyramine or histamine—from which it follows that the ergot alkalies, hitherto supposed to be all-important, play in reality but a subsidiary part in the clinical action of the drug.

In an accompanying note Sir H. H. Dale says: "It seems to me likely that Dr. Moir will be able to make good his claim that, in the active substance now shown to be present in the ordinary liquid extracts of ergot and differing from any of those yet identified in its rapid action when given by the mouth, he has come, at last, on the track of the principle which led to the introduction of ergot into therapeutics . . . . As to the nature of this unknown principle, Dr. H. W. Dudley" [of the National Institute for Medical Research, Hampstead, of which Sir H. H. Dale is Director] "has already made some progress, with Dr. Moir's co-operation, towards identifying the type of substance in ergot responsible for this prompt action with oral administration."

W. B.

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[**The Course of Infectious Abortion** (*B. abortus*, **Bang) in a large Herd of Cattle.** Wall, Sven. 1932. *Skand. Vet-tidskft.* 4. 153-199. 13 tables; Summary in English.]

The author, Director of the State Veterinary Bacteriological Institute, Stockholm, traces the course of disease in a herd of cattle infected with *B. abortus* (Bang). The disease appeared to have established itself as early as 1900 and the herd history is studied from 1900-1931. Most of the conclusions relating to vaccination were the result of observations made during the period 1924-1931. The thirteen tables include statistics of great interest to the laboratory or the field worker.

The conclusions, together with explanatory notes, are as follows:—

(1) An analysis of the incidence of abortions from 1900-1916 shows that, whilst they occur at all times of the year, they are more frequent during April, May and June, the last three months, in Sweden, of winter feeding.

(2) Births which occur before the 269th day after service are premature; births occurring after the 269th day are normal.

The author distinguishes between an abortion and a premature birth. The aborted calf is either still-born or lives for a few hours only without manifesting signs of any disease of post-natal origin.

The premature calf is born alive and comparatively healthy and vigorous.

(3) A relation exists between the number of premature births and cases of abortion. In-

creases in the numbers of abortions are accompanied by an increase in premature births.

The incidence of both these groups is higher in cattle under four years of age than in those over four years.

Both the premature birth and the abortion must be considered as important symptoms of the disease.

(4) The disease, in the herd in question, passed latterly through three evident stages:—

(*a*) An introductory period, lasting one year, characterised by relatively few cases of abortion or premature births, the latter being in the majority.

(*b*) A progressive or spreading phase, of two years' duration, recognised by an increasing number of abortions and premature births.

(*c*) A retrogressive stage, which has now lasted for five years, characterised by a diminution of abortions and premature births, interrupted from time to time by increases (infection relapses).

(5) The subsidence of the disease is governed by two factors:—

(*a*) The development of an acquired immunity;

(*b*) A diminution in virulence of the organism.

The author presents statistics and analyses which lend ample support to the fact that both the above factors play a part in the retrogressive phase.

(6) Animals which, having aborted previously, again abort and give birth prematurely, display a lower immunity than other animals in the same age-group during the same stage of the disease.

(7) The injection of bacterin (killed bacteria) is not beneficial in the case of the infected animals, *i.e.*, those animals which have aborted; the percentage of abortions and premature births is higher after its use. The injection of bacterin bestows a certain immunity on the non-infected animals. In the herd in question a group of 32 cattle which during their first pregnancy calved normally were injected with bacterin; during the second pregnancy eight (or 25 per cent.) of these aborted. A further 71 cattle, living under the same conditions and which calved at full time in their first pregnancy, were not treated; during the second pregnancy 30 (or 42 per cent.) of these aborted. The author deduces that the use of a bacterin " is by no means to be regarded as a valueless procedure in combating the disease."

With regard to the phenomena following the injection of the bacterin the writer observes that whilst no clinically recognisable reaction is induced, serological examinations detect antibodies in the blood after four or five days; the antibodies increase during the next two to three weeks but subside and finally disappear in the course of the succeeding four to six weeks or longer.

(8) Injection of bacterin, simultaneously, into all animals curtails the progressive or spreading phase, reducing it from two years to one; the procedure may cause an increase for the time being in the number of abortions and premature births; it modifies the stage of subsidence through the immunity it confers.

(9) Injection of bacterin should be supplemented, after immunity has developed, by a simultaneous vaccination of all animals with a vaccine of low virulence and of known potency, with the object of eradicating the nine virulent strains of *B. abortus*. This procedure appears to be based on the observation that when, in artificial media, strains of *B. abortus* of varying degrees of virulence are cultivated together, those of low degree of virulence tend to outgrow and finally eradicate the remainder.

(10) All animals that have aborted or have given birth prematurely should be isolated and their stalls cleaned and disinfected, to eradicate the more virulent varieties of the organism.

Such animals should be vaccinated at once with a well-tested vaccine of low degree of virulence in an endeavour to overcome the nine virulent types of organism within the animal body. The animals should not be brought into the steadings until three months after the vaccination.

(11) The isolation method, based upon repeated regular blood tests of every animal, can be employed with advantage during the developmental or subsidence periods of the disease outbreak. During the period of spread the method is inapplicable.

(12) Treatment with bacterin of all animals simultaneously is to be recommended during the spreading stage, and a similar treatment of all young non-pregnant cattle once a year during the subsidence period.

In each of these instances a well-tested weak vaccine should be injected three months after the bacterin-treatment.

G. B. B.

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[The Various Stages of Infectious Abortion in Cattle determined partly by disease-history and partly by means of blood tests from the infected herd, taken twice in succession, with an interval of one month between the tests. Wall, Sven. (1932). *Skand. Vet.-tidskft.* 5. 257-270. 8 tables.]

This article constitutes a complement to an article on abortion in cattle published in *Skand. Vet.-tidskft.* 1932. 153. In the summary the author states that:—

(1) it is important to diagnose the various phases of infectious abortion in cattle, as a basis

on which to ground the choice of the means of combating the disease;

(2) the diagnosis of the stage at which the disease is, in a given herd, can be based on the herd history and blood tests.

(3) certain rules can be laid down by which the disease stage may be determined from the herd history and blood tests.

In addition, the author gives a warning against the employment of the stamping out method in order to eradicate the disease unless precautions are adopted to prevent re-infection of the herd.

G. B. B.

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[**Atypical Cases of Acetonæmia.** Hallenborg, T. (1932). *Skand. Vet.-tidskft.* 5. 240-244.].

Acetonæmia in cattle occurs typically about two weeks after parturition, and recovery is the rule. The author first describes four atypical cases; in three of these the illness began before or at calving, whilst the fourth showed symptoms four months after parturition. This fourth case recovered; of the remaining three, two died two and seven days after calving and the third was slaughtered. The symptoms, attempted treatment and *post-mortem* findings (except in one case) are recorded. The diagnosis in all cases was confirmed with a positive Legal's urine test. No reference is made to the diet received by the animals attacked. The fatal cases occurred respectively in February, May and June and the recovered case in March.

From the above cases the author postulates that the more nearly related the attack of acetonæmia is to parturition the less favourable is the prognosis.

From observations on other cases, two of which are described, the author advises, as a line of treatment, the intravenous injection of 1,000 c.c. aqueous solution of sodium bicarbonate containing 100-150 grammes per litre.

G. B. B.

INSURANCE CERTIFICATES: A HOLIDAY REMINDER

The Automobile Association draws attention to an important legal requirement in connection with Insurance Certificates. Many motorists appear to be unaware that if the certificate is not shown to a police constable on request, it must be produced at a police station within five days. This point, if overlooked, is liable to cause considerable inconvenience. Only recently an A.A. member was obliged to curtail his holiday in Scotland and return to the South of England to re-open his house, obtain the certificate, and satisfy the requirements of the law. The A.A. points out that such contingencies will be avoided if the Insurance Certificate is carried in the car.

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Argentina, Australia, New Zealand and Brazil between them supplied 68·4 per cent. of the meat sold at Smithfield in 1931. Scotland supplied 6·7 per cent., and England and Wales 14·3 per cent.

Report

STOCK DISEASES IN WESTERN AUSTRALIA

REPORT (1932) OF THE ROYAL COMMISSION ON THE ADMINISTRATION AND APPLICATION OF THE REGULATIONS UNDER THE STOCK DISEASES ACT, 1895*

The Commission of enquiry conducted by Lieut.-Colonel Max Henry, Chief Veterinary Officer, New South Wales, to which reference was made in the *Veterinary Record* of March 26th last, has now published its Report. The Report deals with the restrictions imposed by regulations published in the Government Gazette on October 12th, 1929, under the Stock Diseases Act, 1895, upon the movements of livestock from the Kimberley district of Western Australia, where it appears that certain diseases: contagious pleuro-pneumonia, tuberculosis, actinomycosis, and the ectoparasites (cattle tick and buffalo-fly) are endemic. As tuberculosis and actinomycosis are found in all parts of Australia, the Commission was concerned chiefly with the regulations relating to pleuro-pneumonia and the ectoparasites named. The regulations are framed to protect the southern portions of Western Australia from the introduction of these pests from East and West Kimberleys. The southern portion of the State is at present declared to be free from these troubles and it appears that the only other State of Australia which shares this immunity is Tasmania, which is entirely free.

It is contended that under the present regulations trade is hindered and undue hardship inflicted upon graziers and others interested in the Kimberley stock industry who, in order to permit of greater latitude of movement, desire to have them removed or at least modified. In this connection Colonel Max Henry rightly condemns the opinion expressed that pleuro-pneumonia, even if introduced, could readily be controlled by the stamping-out policy. He points out that this is not the experience of other countries. One of the most dangerous features of this complaint is its insidious character, rendering detection difficult and often impossible during the life of the animal which, in the meantime, acts as a "carrier" of infection. Prophylactic inoculation is not unattended by risks and Colonel Henry records from his own experience a loss of 30 per cent. in a dairy herd following this practice. The potential development of an export cattle trade from Western Australia, especially with regard to dairy herds, would be seriously prejudiced if pleuro-pneumonia contagiosa were suspected to exist in the present

* F. W. Simpson, Government Printer, Perth.

clean areas. To the arguments advanced by interested parties in favour of greater freedom of movement, Colonel Max Henry aptly remarks that "Stock owners are willing to take considerable risk with diseases which they do not understand." Instead of encouraging movements south, markets for the northern (Kimberley) cattle should be sought for further north. "The closing of the meat works at Darwin, Normanton, and elsewhere in the north was a calamity for Australia. The drive of cattle southward has been followed by very undesirable results in the shape of the spread of disease and parasites."

In regard to pleuro-pneumonia, the Report maintains that if adequate protection of the southern portion of Western Australia is to be effective it does not appear that the present restrictions allow of modification save in certain minor points.

Dealing with cattle tick, the Report states that the Regulations appear to provide adequate protection from invasion proceeding from the north. A voyage of seven days followed by an arsenical dip and slaughter at abattoirs under quarantine conditions, are precautions deemed to be reasonably safe. "Under present conditions cattle tick cannot be eradicated, and it would be dangerous to do so, since with it would go the immunity of the cattle to piroplasmosis with consequent mortality when the almost inevitable re-infestation took place."

Buffalo fly is in another category, since fly may escape notice and be landed with the cattle or, in its larval stage, be landed with manure. Spraying immediately after landing and the sweating of the manure in covered pits are measures suggested in the Report to reduce the risk to negligible proportions. A cattle-free buffer to avoid spread of the fly along the coast is also considered necessary. As the limit of the fly is not yet known definite measures to minimise risk of introduction are impracticable.

Referring to the question of undue hardships caused by the restrictions which, it is contended, have led to a lowering in prices of Kimberley cattle, the Report is not in agreement. Prices in Victoria from 1929-31 have dropped by 40 per cent., in Queensland by 25-27 per cent., and in Western Australia by 24 per cent. Without any restrictions it is doubtful whether profits could have been realised on cattle coming from Kimberley to the Freemantle markets. Lower market charges are indicated to restore the balance of profit and loss, and also the exploration of the Java market and the sale of store cattle to the Northern Territory and Queensland.

On the view expressed that it is unnecessary to employ highly-qualified veterinary surgeons to frame regulations restricting the movements of stock, the Report says: "Such a statement, considered in conjunction with the subject under discussion, reveals a confusion of thought which is unfortunately not uncommon. The essence of the problem before this Commission is not the movement of cattle in itself, but the movement of disease and parasites for which the cattle act as vehicles. An intelligent stock-man could, no doubt, frame regulations governing the movement of stock as such, but to frame regulations for the control of disease and parasites requires a very sound knowledge of comparative pathology, the methods of spread of different diseases, the life history of parasites, and much else which is only possessed by the trained man." . . . . "The primary function of every official veterinary service in the world is the *prevention* and control of disease."

Colonel Henry remarks upon the proclivity displayed by cattle in parts of West Kimberley to bone chewing as indicating deficiency of calcium and phosphates in this district. Failure to fatten also constitutes a problem demanding further inquiry.

In conclusion, one would suggest that the value of the Report would have been enhanced had a map of the locality under consideration been appended. The additional expense of publication which this would have entailed may have been a reason for this omission.—H. A. R.

Tuberculous Milk

Conference on People's League of Health Proposals

At a meeting convened by the People's League of Health, held at the Mansion House under the Chairmanship of the Lord Mayor on July 11th, the report issued by the League on the subject of tuberculosis of bovine origin in Great Britain (noticed in the *Veterinary Record* of April 2nd, 1932, pp. 375-380) was explained by Dr. W. G. Savage, and supported by Lord Dawson of Penn, Lord Moynihan, the Lord Mayor of Manchester, and Mr. James Mackintosh. Medical and trade representatives attended from all parts of the country.

Dr. Savage, who was the chairman of the special committee appointed to prepare the report, referred to the three suggestions made to deal with the problem of tuberculous milk. One was the elimination of tuberculosis from the herds of the country; that would be a lengthy programme, but the committee believed that a start could be made comparatively economically by a re-orientation of policy. Secondly, the committee would seek to encourage tubercle-free herds. There were only about 400 herds in England and Wales complying with the conditions laid down by the Milk Designations Order. That was the result of nine years of hampering restrictions. Nomenclature was uncertain, and encouragement was not given.

The Committee then came to the question of pasteurisation. Without a doubt, pasteurisation did kill the tubercle bacillus. Possibly the process had some effect upon the milk contents, but the lack of any particular content could easily be made good. On the administrative side there were difficulties. To overcome them the Committee put forward proposals in very definite

form. It should be remembered that pasteurisation killed other germs besides the tubercle bacilli.

The Committee suggested that the larger areas should have power to require that all milk coming into their area should be either efficiently pasteurised or from herds certified as free from tuberculosis. It was an adoptive matter. No city in this country had any power to protect its milk supply. There would have to be legislation, but it need only be a simple adjustment. The results would be of benefit to all sections of the industry of milk producing. The consumer would get safe milk; the trade would have what it had not now, a feeling of security; the agricultural interests would benefit; and, with safer milk, the consumption would increase, making the industry more of a paying proposition than it could be said to be at present. The solution lay for the moment in pasteurisation, and that would cost about ½d. a gallon.

Lord Dawson of Penn, president of the Royal College of Physicians, said that some years ago Toronto established machinery whereby the whole of the milk entering the city was pasteurised. In the course of the last 10 years there had not been a single death in the city of Toronto from bovine tuberculosis. That was a valuable testimony. Pasteurisation was criticised in this country because it diminished the wholesomeness of milk, but actual clinical experience showed that the case for pasteurisation was overwhelming. Any deficiency in content could be supplied from outside sources in a child's food. The work of pasteurisation was to a large extent educative; a larger knowledge of the advantages would cause the practice to spread. With a certain amount of encouragement the great milk companies would take upon themselves the duty of pasteurising their milk. Already that was done on a fairly large scale in London. By far the greatest proportion of milk consumed in London was pasteurised at the hands of the big companies.

Lord Moynihan, president of the Royal College of Surgeons, also gave the support of his association to the work of the League. Putting the question as to what kind of a reception the report was likely to have, he said that when he dealt with just the same subject and made the same pleas in his maiden speech in the House of Lords he met with much opposition from the Farmers' Union. Even the Ministry of Agriculture did not seem to recognise the real burden of suffering and disease caused by drinking impure milk. The desire of the Ministry seemed to be to advance the consumption of milk rather than to secure purity of supply. Actually he would like to see much more milk drunk; but it would have to be purer milk. In the United States of America the average consumption per head was twice our English consumption, in Canada three times, and in the Scandinavian countries as much as six times. A dearer milk would give the farmer enough money to enable him to afford to pasteurise. For that reason he (Lord Moynihan) would welcome a halfpenny or a penny more on the price of milk.

The Lord Mayor of Manchester said that his city was given extensive powers by Parliament in 1899, when, in a local Bill, the city was empowered to make bacteriological examinations and to supervise the milk supply of its people. Probably no city in the world had given more intensive study to that form of control. His presence at the meeting of the People's League of Health was a direct outcome of that extensive experience, inasmuch as the city, as a health authority, was satisfied from the results obtained that the methods hitherto used were ineffective in providing a safe milk supply for the people. Shortly before the League's report was issued, the City Council decided to seek Parliamentary powers to compel the pasteurising of the whole of the milk supply of the city, with the exception of the two highest grades of milk. He moved the adoption of the report and recommendations.

Mr. James Mackintosh, of the National Institute for Research in Dairying, seconded, and the meeting agreed.

A resolution urging upon the Government "the imperative need of giving early practical effect to the proposals" of the report was adopted.

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TUBERCULOSIS MORTALITY RATES

The continuous decline in the number of deaths from tuberculosis is referred to in the report for 1931 of the Council of the National Association for the Prevention of Tuberculosis, which was issued recently. The latest figures available are those for 1930, which are as follows:—

	England and Wales	Scotland
Total number of deaths from tuberculosis:—		
All forms	35,745	4,286
Pulmonary	29,414	3,024
Death-rates from tuberculosis per 100,000 population:—		
All forms: Males ...	103·7	95
Females ...	77·0	82
Pulmonary: Males ...	86·3	68
Females ...	62·4	58

"These mortality rates," adds the report, "are the lowest which have yet been recorded in Great Britain. All ages and both sexes share in the decline, which is more marked in childhood, and less marked in young adult life and old age than at other ages." The report comments favourably on the work accomplished at the Burrow Hill Sanatorium Colony, where youths are not only treated for tuberculosis but are trained for various occupations.

"In the present economic position of the country," it is stated, "when it is often difficult to find suitable occupations for healthy youths, naturally the difficulties are enhanced in the case of those handicapped by tuberculosis. It is, therefore, gratifying to find that information available regarding 64 ex-patients shows that 11 were working as clerks and nine as gardeners, thus directly utilising the training received at the sanatorium, while 18 were engaged in other work for which, no doubt, the education given in the institution had rendered them more competent. Unfortunately, 19 were reported to be without employment. Only four were unfit to work."

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Empire Cancer Campaign

The Duke of York, presiding at the ninth annual meeting of the British Empire Cancer Campaign, held on July 12th, said he was satisfied that from the start waste of energy and funds had been avoided by prevention of overlapping, and that all means in their power were being used to solve the baffling problem of cancer. There was much in the latest annual report which marked progress, and if they could obtain the financial help so vitally necessary for that work they might look with confidence to finding the solution, which would mean so much to sufferers throughout the world.

Sir Thomas Horder, in moving the adoption of the annual report, said the International Conference of 1928, held in London and convened by that campaign, was responsible for infusing fresh

vitality into research on cause and treatment, not only here, but throughout the world. The credit for that stimulus belonged to the campaign, and was reflected in the standard of work carried out at all its centres. The report showed that there had been no slackening of the quest, both for cause and for treatment. He felt sure that it was sound policy to pursue both quests with equal vigour, for it was quite impossible to say along which of those two lines they would first achieve control of the disease. "Control" was a fitter word than "cure"; it was possible to "control" a disease before knowing its cause.

The Cancer Hospital had continued its investigations upon substances capable of producing cancer in animals, and at the Leeds centre the inhibitory action of mustard gas had been further studied. The Birmingham centre had investigated tobacco-smoking as a cause of cancer, or rather the experimenter had painted the backs of mice with the tars which had been left behind after various tobaccos had been burnt. Smokers would be pleased to know that only one out of a very large number of mice so painted had developed a tumour, and they had to remember in this connection that mice similarly treated with ordinary coal tar developed tumours very frequently.

Mice Immunised

Last year's report recorded that Dr. Lumsden had succeeded in immunising mice against cancer, and also in effecting the disappearance of tumours in these animals by the use of serum. By a process of detoxication of this serum Dr. Lumsden had succeeded in giving much larger doses, and had found that by this means he was able to get much better results. Even though this advance referred to mouse cancer, and not to human cancer, this line of research appeared to become more and more promising.

Prominent in research into treatment were, of course, X-rays and radium. It was good to know that the campaign was working in close co-operation with the National Radium Commission. He thought he was right in saying that the campaign was the godfather of that beneficent organisation, among the trustees and commissioners of which, incidentally, were many members of their Grand Council. They looked forward hopefully to the emergence of data which might have far-reaching results from the mass of statistics which would be available from the combined records which were now kept at all treatment centres.

They looked to the National Radium Commission to give them the final decision as to whether the hopes built upon bomb therapy had justified the use of massive dosage at a distance, and, if the answer was in the affirmative, assurances that effective arrangements would be made so that the method might be available for patients in this country. From the various reports now before them it was obvious that radium treatment was carefully and efficiently carried out by the many branches or affiliated organisations of the Campaign.

He trusted that it was apparent to all that in our Dominions, and in the Home Country, the Empire was pulling its weight in the relentless attack upon cancer. This pioneer campaign was doing its utmost, and if the British public, with its never-failing generosity, would see them through with adequate financial help, they could respond to every one of the calls made upon them.

The report was unanimously adopted. All the chief officers of the campaign and the members of the Grand Council and the various committees were re-elected.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

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DIARY OF EVENTS

July 29th.—Meeting of the Royal Counties Division, N.V.M.A., at the Zoological Gardens, Whipsnade.

July 29th.—Meeting of the North Wales Division, N.V.M.A., at Llanrwst.

Aug. 2nd.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, at 4.30 p.m.

Aug. 8th-13th.—N.V.M.A. Jubilee Congress at Folkestone.

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PERSONAL

At the recent Liverpool University degree day Mr. F. Ronald Edwards, son of Mr. F. G. Edwards, F.R.C.V.S., Chester, was awarded the degree of M.B., Ch.B., with honours, and distinction in Surgery. He has also obtained the diploma of L.R.C.P. (Lond.) and M.R.C.S. (Eng.), and has been appointed house surgeon at the Liverpool Royal Infirmary.

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Mr. Geo. R. Jamieson, M.R.C.V.S., Haddington, has been appointed temporarily to fill the vacant veterinary inspectorship of East Lothian, caused by the recent death of Mr. Andrew Hume, M.R.C.V.S.

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R.C.V.S. OBITUARY

Danels, L., Brevet Lieut.-Colonel R.A.V.C. Assistant Director-General A.V.S. Graduated London, August 8th, 1905; died July 10th, 1932.

Stevenson, William, late of Garden Lodge, Voyle Road, Rangoon, Burma. Graduated London, June 23rd, 1886; died February 6th, 1932.

. . . . .

Lieut.-Colonel Leonard Danels, R.A.V.C.

The death of Lieut.-Colonel L. Danels, R.A.V.C., Assistant Director-General, Army Veterinary Services, War Office, which occurred on July 10th, 1932, at Queen Alexandra's Military Hospital, Millbank, in his 48th year, is deeply mourned by all his brother officers in the R.A.V.C.

Colonel Danels endured a long and wearying illness lasting nearly three months, with great fortitude and courage, showing throughout his illness that spirit of complete unselfishness which was the great attribute of his character.

He was the son of the late Richard George Danels and was born at Streatham on August 8th, 1884. He received his first education at Cranleigh School and in October, 1901, he entered the Royal Veterinary College, London. Four years later, on his 21st birthday, he qualified as a Member of the Royal College of Veterinary Surgeons.

His career as a student was a brilliant one and at his third professional examination he was awarded the "Walley" Memorial prize; the following year he was awarded the "Fitzwygram" First prize.

On August 26th, 1905, he was commissioned to the Army Veterinary Corps as a Lieutenant and after serving a short time at Home was posted for

a tour of duty in India. He was promoted Captain August 26th, 1910.

After completing his tour in India he served for awhile at Home and in June, 1913, left for a tour of service in the Sudan, where he served until the outbreak of the Great War. He accompanied the First Expeditionary Force to France in August, 1914, where he remained until August, 1915, for four months of that period performing the duties of Assistant Director of Veterinary Services, 27th Division.

For services rendered during this period he was mentioned in despatches in the London Gazette of February 17th, 1915.

He left France in August, 1915, to return again to the Sudan, where he served continuously for nine years, until June, 1924. In the early part of his Sudan war service he was again mentioned in despatches in the London Gazette of October 25th, 1916.

During the years 1917-18 he took part in the operations in the Myiama Hills, Nuba Mountains Province, and for services rendered during these operations he was decorated with the 4th Class of the Order of the Nile and received the Sudan Medal and Clasp.

In July, 1918, he was appointed A.D.V.S., Sudan, and granted the temporary rank of Major, and later in December, 1922, was appointed Principal Veterinary Officer, Egyptian Army, and Director of Veterinary Services, Sudan, with the temporary rank of Lieut.-Colonel, a post which he retained until June, 1924.

In recognition of these services he was promoted to the 3rd Class of the Order of the Nile in June, 1924.

He returned to England in June, 1924, and served in the Aldershot Command until January, 1927, when he was posted as A.D.V.S., Shanghai Defence Force, where he served until October of that year.

On his return Home he commanded the Depôt, R.A.V.C., until July, 1929, when he was appointed Officer i/c Records, R.A.V.C., and in April, 1930, he went to the War Office as Assistant Director-General, Army Veterinary Services.

On January 1st, 1932, he was made a Brevet Lieut.-Colonel.

Colonel Danels had a quiet and unassuming disposition, the very embodiment of unselfishness. He was gifted with a remarkable memory and was talented above the average. His character was of the highest integrity and he endeared himself to all who knew him. In accordance with his express wish he was buried in Brookwood Cemetery, in a quiet spot he had selected some time back to be his last resting place, on Wednesday, July 13th.

Great sympathy is extended to his widow and three sisters.

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The Late Mr. C. A. Powell.

In reference to the late Mr. Charles Ault Powell, M.R.C.V.S., of Sand House, Potsgrove, who passed away at St. Bartholomew's Hospital, London, on July 1st, and whose death was recorded in our last issue, the *Luton News* of July 7th states: "Mr. Powell qualified as a veterinary surgeon 37 years ago and was the third generation of his family to carry on practice as a veterinary surgeon at Sand House, being preceded by his grandfather and father. He assisted in the practice until the death of his father 25 years ago and had since carried on in his own name.

"He was recognised as a clever veterinary surgeon and was much sought after by the farmers of the district. He was also an Inspector for the Ministry of Agriculture at Bletchley and Leighton Buzzard markets and during the war he assisted to carry on the practices of other veterinary surgeons whose services were required for the Army.

"Mr. Powell was, in his youth, a member of Potsgrove Church choir, as also was his sister. For some years afterwards he was a churchwarden.

"Besides the widow and son, who is also a veterinary surgeon, five daughters survive."

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REGISTER OF VETERINARY SURGEONS

The Registrar of the R.C.V.S. desires information as to the present whereabouts of the following members:—

R. C. Bell,	formerly of	Brisbane, Queensland, Australia.
M. J. Brett,	„	the R.A.V.C.
P. Connolly,	„	2, High St., Andover.
W. J. Cooper,	„	3, Somers Rd., Reigate.
Capt. A. Crapp,	„	164, Hammersmith Rd., W.6.
Major T. J. Faithfull,	„	Wereham Hall, King's Lynn.
N. Gilford,	„	Hart & Co., Dharamtollah, Calcutta, India.
C. F. Hulford,	„	48, Uxbridge Rd., Hanwell, W.
B. M. Gunn,	„	70, De Laney St., N.W.1.
T. Kilpatrick,	„	53, Eglinton St., Belfast.
Capt. J. F. MacIntyre,	„	21, Hooper Lane, Durban, Natal.
Capt. E.E.Maclachlan,	„	151, Byres Rd., Glasgow.
Capt. R. C. Matthews,	„	The Oaks, Ditchling, Sussex.
Capt. A. V. Meeke,	„	The Alders, Saughall Massie Rd., Upton, Wirral.
R. Miller,	„	The River Wyre Hotel, Poulton-le-Fylde, near Blackpool.
M. G. O'Connell,	„	Bridgemary House, Fareham.
A. J. O'Leary,	„	Rancocas Farm, Jobstown, New Jersey, U.S.A.
J. C. Paton,	„	24, Worple Rd., Epsom, Surrey.
Capt. R. S. Pethick,	„	17, Heathcote St., W.C.1.
Capt. S. G. P. L. Richardson,	„	158, Lower Richmond Rd., S.W.15.
Capt. H. M. Roemmele,	„	28, Royal Exchange Square, Glasgow.
W. G. Senior,	„	Carmona, Roman Rd., Weymouth.
J. E. Shacklock,	„	17, Holmdale Rd. N.W.6.
Capt. R. Spooner-Hart,	„	Camperdown, N.S.W.
A. Wall,	„	Bull Hotel, Ludlow, Salop.
J. E. Wallis,	„	3, Hyde Gardens, Eastbourne.

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B.M.A. CENTENARY MEETING.

We are asked to state that Major W. M. Mitchell has changed the title of his paper to be presented to the Section of Comparative Medicine on July 28th, from "Nerve Degenerations in Equines" to "Chronic Arthritis in Equines."

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.
All correspondence must bear the name and address of the contributor for publication.
The Editor does not hold himself responsible for the opinions of his correspondents.

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THE PATHOLOGY OF REPRODUCTION

To the Editor of the Veterinary Record.

Sir,—Please accept my sincere thanks for your courtesy in sending me copies of *Veterinary Record* of June 25th containing the first of the five addresses on "The Pathology of Reproduction."

Now that the appearance of this series of articles in *Veterinary Record* has been definitely begun, I feel it would not be wholly out of order that I should express to you my gratification over the event. Eight years ago the N.V.M.A. of Great Britain and Ireland honoured me by asking the A.V.M.A. to delegate me to address your national meeting at Aberdeen. Prior to the date of the invitation I had agreed to contribute to the programme of the A.V.M.A. a description of the material constituting the basis of the later article, "Studies in Genital Disease," which appeared in the *Cornell Veterinarian* in October, 1924. I then believed it to be, and still think it, one of the best pieces of work with which I have been associated. It was my intent to present this before the A.V.M.A. and then leave at once for Aberdeen and after such revision as was possible *en route*, to again present that subject at Aberdeen.

My ambition was wrecked. If the A.V.M.A. took any action whatever upon the request of the N.V.M.A., or gave to the request any attention or consideration, the fact was not communicated to me. Without knowingly having contributed to the confusion, I found myself placed in a very embarrassing and disagreeable position toward my British confrères and felt compelled to withdraw from the programme of the A.V.M.A. and to refrain from attending either meeting.

Now, after the lapse of eight years, some of the ideas I had wished to present in Aberdeen are to appear as vital parts of this contribution, virtually constituting the background of the fifth lecture as well as being interwoven, here and there, in other parts. It is consequently especially gratifying to me that this series of articles is to be placed before the British veterinary profession, for which I have always cherished the highest esteem. While it is not to be expected that my views will be universally, or even generally accepted in Great Britain, any more than in America, I do entertain the hope that many will be stimulated to carefully re-examine the questions involved.

Yours very truly,
W. L. Williams.

209, White Park Road,
Ithaca, N.Y. *July 7th*, 1932.

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A CLINICAL COMMENTARY

To the Editor of the Veterinary Record.

Sir,—May I make the following observations which suggested themselves on reading the current *Record*:—

1. *Mr. Matthews' paper on Clinical points in examination of the cow for Tuberculosis.*—It has been found that when more than ordinary discomfort is shown on rectal examination of a cow (straining, arching the back, grunting or groaning, or "anal breathing" after examination, etc.), it is frequently almost diagnostic of tuberculosis, particularly when kidney, bladder and uterine troubles have been eliminated at the same examination.

2. *Nutritional and Metabolic disorders of cattle*—by Sjollema, B. (abstract).*—Acetonæmia, ketosis or aceturia (known in Britain as post-partum dyspepsia): This disease is cured specifically by the simple method of milking only once daily. In the advanced case where the milk yield is greatly diminished, the preliminary treatment of inflation of the udder is indicated. It appears that taking about two-thirds of the yield away from the cow, corrects the deficiency in from seven to fourteen days according to the case.

3. *Calcium treatment of Milk Fever*, by J. F. D. Tutt (letter).—The writer has not observed a case of sloughing after treating the disease by the subcutaneous injection of calcium gluconate. The method adopted is to inject (under strict antiseptic conditions) only 50 cc.'s at any one point. Sometimes pain has been in evidence on pressure at points of injection, and occasionally movement (of the neck muscles) has been somewhat restricted on account of discomfort.

Yours faithfully,
"Charnwood," Oscar Stinson.
Appleby,
Westmorland.
July 17th, 1932.

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[* In connection with this abstract a correspondent points out that in his article Sjollema definitely states, in the section dealing with grass-tetany, that an injection of calcium chloride *and* magnesium chloride is used to bring about recovery, whereas from the isolated statement quoted in the abstract practitioners are led to believe that a cure can be effected by calcium salts and that this is Sjollema's treatment—neither of which is the case.—Ed., *V.R.*]

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PRESERVATION OF GUERNSEY'S FREEDOM FROM BOVINE TUBERCULOSIS

To the Editor of the Veterinary Record.

Sir,—In the *Veterinary Record* of the 9th inst. appeared a note that the Island of Guernsey *only* spent £5 10s. towards the eradication of bovine tuberculosis in the year 1931. This statement is very deceptive, as to the unitiated it would appear that Guernsey was very dilatory in this very important work. The sentence should be that "Owing to the care, prevision and continual expenditure of the States of Guernsey during the last 30 years only £5 10s. was needed from public funds (not for the eradication of) but for the preservation of the Island's freedom from the disease in 1931." As I will explain, Guernsey is far in advance, *re* bovine tuberculosis, of any other part of the British Empire.

Many years ago, Guernsey farmers were allowed to show their cattle in England, and against the advice of the then Veterinary Officer, namely, my esteemed friend Mr. G. W. Foote, to re-import them. These animals returned to the Island with flying colours in the form of many ribbons and prizes, but, unfortunately, also with tuberculosis. The Americans at that time took a fancy to the Guernsey breed and came over to buy cattle for export to America subject to their passing the American tuberculin test. To cut a long story short, reactions were found on the farms from which animals had been sent for show and on adjacent farms, also on farms where the owner had bought from these farms. The States of Guernsey being advised by their Honorary Agricultural Committee, whose great foresight saw the effect the disease would have on the Island's trade, over 30 years ago passed a law:—

1.—No bovine animal being exported for show could be re-imported except for slaughter at the abattoir which is on the quay.

2.—That no bovine animal could be imported from England or the Continent except for the same purpose.

3.—That all bovine animals above the age of six months being sold, exchanged, or transferred from one farm to another in the Island must be subjected to the tuberculin (subcutaneous) test by a veterinary surgeon.

4.—In the event of a reaction or suspicion of a reaction, the veterinary surgeon shall notify the States Supervisor (Local Authority) who will instruct the States Veterinary Officer to re-apply the test in the case of suspicion and condemn in case of reaction and to test the whole herd.

In the case of one or more reactions the animal or animals must be valued by two valuers, one appointed for the States and one appointed for the owner; it or they may be valued up to £40 each; it or they are to be immediately destroyed and the owner paid half of the agreed valuation. The cost of the initial test is borne by the vendor, who employs his own veterinary surgeon, the second test is paid for by the States and they employ their own Veterinary Officer.

It is not compulsory to test animals going to England, but nearly all buyers insist on this being done and latterly by the double intradermal test.

Now, Sir, this practice having gone on for over 30 years, it must be acknowledged that, since the public expenditure on tuberculosis in 1931 was only £5 10s., we have won a hard-fought battle and eliminated the disease from our Island. At the same time it must not be thought that this amount represents anything like the amount expended on keeping our Island free. As I have already said, every animal above the age of six months changing hands must be subjected to the tuberculin test. In the year 1931, *viz.*, that under question, 1,096 bovine animals were subjected to the tuberculin test by the subcutaneous, double intradermal, or ophthalmic method in the Island of Guernsey, with only one suspicious reaction. For a few years we have had nothing more than one suspicious case and the States expended £5 10s. on this case and the in-contacts on tuberculin, etc. Incidentally, on re-test this animal failed to react. The cost of the test of these 1,096 animals was borne by the farmers.

Do you not therefore agree with me, Sir, that the States of Guernsey, which has spent thousands of pounds on the eradication of bovine tuberculosis, are to be congratulated on having so succeeded that the expenditure from public funds of only £5 10s. was necessary in the year 1931? We have our herds clean now and intend to keep them so.

Since the occurrence of foot-and-mouth disease on the mainland no live bovine animal is allowed to land in the Island, even for slaughter. Further, no organic manure of animal origin is allowed in the Island except with a certificate of approval of plant of sterilisation from the Board of Agriculture of England.

Finally, all animals tested for tuberculosis have to be reported monthly to the Supervisor by the veterinary surgeon. The name of the farmer, his address and the date of the test are therefore known. All bovines, except steers, are registered on the Herd Book and when bought and sold have to be transferred with the veterinary certificate. All animals sold for export are tattooed by the Island Officials after they have passed the test of a veterinary surgeon.

I do not think for one moment that you suggested in your note that Guernsey is backward as regards tuberculosis, but it might be read as such by those who know nothing of the Island and casually read your note. When asked for advice by the owner of a grade "A" tuberculin tested herd they might refer to the sum of *only* £5 10s. and give wrong advice.

I do hope this letter will not be amiss and will explain the whole situation, and will enable your readers to appreciate the wonderful achievement of the Honorary Agricultural Committee, the States Supervisors and their staffs in the eradication of bovine tuberculosis from the Island of Guernsey.

I am,
Yours faithfully,
Eustace J. Lainé, M.C., M.R.C.V.S.
Edgeborough, Grange,
Guernsey. *July*, 1932.

Diseases of Animals Acts, 1894 to 1927

SUMMARY OF RETURNS

Period.	Anthrax.		Foot-and-Mouth Disease.		Parasitic Mange.		Sheep Scab.	Swine Fever.	
	Outbreaks confirmed.	Animals attacked	Outbreaks confirmed.	Animals slaughtered as diseased or exposed to infection.	Outbreaks reported by the Local Authorities.	Animals attacked	Outbreaks confirmed.	Outbreaks confirmed.	Swine slaughtered.
Period 16th to 30th June, 1932	No. 7	No. 7	No. —	No. —	No. 3	No. 9	No. 1	No. 74	No. 41
Corresponding period in 1931	18	18	60	6,528	6	6	8	129	48
1930	12	13	—	—	4	7	1	115	63
1929	8	9	—	—	5	26	7	161	103
Total 1st January to 30th June, 1932	221	276	3	227	79	138	130	1,057	504
Corresponding period in 1931	280	298	65	7,043	88	154	181	1,066	444
1930	221	235	—	—	142	212	256	1,387	552
1929	241	273	23	1,895	140	302	331	1,038	577